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[ORIGINAL COMMUNICATION.]

REMARKS ON THE DIGEST OF CRITICISMS ON THE U. S. PHARMACOPOEIA.

BY PROF. CHAS. T. P. FENNEL, CINCINNATI, O.

I. GENERAL TOPICS.

Specification of Time.—The date on which the new Pharmacopoeia goes into effect should be definitely fixed—July 1st, 1891. This date would give ample time for the revision and the publication, especially under the present conditions.

Nomenclature and Language.—The text should be in the English language, the titles should be in the Latin. The text is intended for the pharmacist, the title for the physician. The Latin language is chosen for the latter, since the terms are more concise and less cumbersome in phraseology; being a dead language, it is not so liable to changes. The English titles are more for convenience than for any practical purpose. In many instances these terms give but superficial information.

Techeppe's remarks in the *Pharm. Rundschau* are well taken and should receive full consideration by the Committee on Revision. The question will be, Shall the terms be strictly scientific or rather conform with terms in common usage? The former will give a very cumbersome term in many instances, but true to the exact nature, structure, and composition of the substance. The terms of common usage are generally short and consequently deficient in definition. To follow either course exclusively would be unsatisfactory—a compromise must be effected, and this can only be accomplished by adopting both methods. Qualifying adjectives are in many instances necessary to prevent misunderstanding. Thus *Aconitum* (scientific method) refers to the whole plant, and consequently the official preparation would require the prefix *Radix*, governing the genitive case. But if *Aconitum* (present or common usage) is understood to mean nothing but the tuberous root, the prefix is entirely unnecessary.

Standards.—All crude drugs and galenical preparations should be standardized. Crude drugs should be valued according to the amount of chief active constituent contained in them (determined by approved and specified methods). The secondary and other constituents must bear some definite relation to the principal one, and as a natural consequence insure therapeutic value to preparations of these. Unless crude drugs meet certain specific characteristics and are standardized as to strength, they deserve no place in the Pharmacopoeia. The description of crude drugs depends upon the method adopted in the nomenclature, necessitating a description of the plant and the part used.

Assays.—It naturally follows that if crude drugs are standardized a method for determining strength must be incorporated in the Pharmacopoeia. These assays should be as simple as possible, requiring apparatus at the disposal of every pharmacist. The results will of course be only approximate, but at least form a good guide for the limit of strength.

Adulterations.—These should not enter into the Pharmacopoeia. The description of all drugs applies only to the pure article, and there is therefore no necessity for calling attention to probable admixtures. The limit of by-products should be mentioned.

Specification of Strength.—If the foregoing is followed, the strengths will be specified.

Specific Volumes.—The term "specific volume" was, it seems, coined by Prof. O. Oldberg to express the relative volumes of liquids in the same sense that specific gravity expresses relative weight. A knowledge of the laws of specific gravity furnishes a simple method for calculating the volume of a liquid when its weight and specific gravity are known, and, conversely, its weight when volume and specific gravity are known. Specific gravity may be expressed by the formula: $\text{Specific gravity} = \frac{\text{absolute weight}}{\text{volume}}$; therefore $\text{absolute weight} = \text{specific gravity} \times \text{volume}$, expressed in the corresponding weight. $\text{Volume} = \frac{\text{absolute weight}}{\text{specific gravity}}$, expressed in the corresponding measure.

The corresponding weights and measures of distilled water at 62° F. are as follows:

1 grain corresponds to 1 fluid grain.

1 gramme corresponds to 1 cubic centimeter.

1 avoirdupois ounce corresponds to 1 imperial fluid ounce.

The Troy ounce has no corresponding measure.

The subject of specific gravity, absolute weight, increase

and decrease of volume, is discussed in Fennel's "Principles of General Pharmacy" (pp. 29-43).

The tables of specific volumes that have been computed are of service in many instances, but their main object has been defeated. The application of these tables for parts by weight does not simplify the formulæ of the Pharmacopoeia. The subject of specific gravity is but little understood and much less applied. The subject of specific volume will fare no better, and is, therefore, practically of no value. If the weighing of liquids is so objectionable, the revisers of the next Pharmacopoeia should be instructed to substitute parts by measure for liquids. But if the system "parts by weight" is to be retained, it seems far more rational to adopt the general rule based upon the laws of specific gravity and translate the language of weight to that of volume by calculation. That the volume of a liquid is most accurately obtained by weighing there can be no doubt. Judging from the literature on the subject, the primary consideration seems to be convenience, and the method not meeting that want is condemned.

Specific Gravity.—This question has received so much consideration by able men, notably Drs. A. B. Lyons and E. R. Squibb, that but little remains to be said. The Pharmacopoeia is intended for the benefit of the pharmaceutical profession as a whole and not for a few scientists, and therefore the requirements should meet the wants of the majority. There is no necessity of prescribing a uniform method for the taking of specific gravities of liquids; no matter what method is pursued, the results must be the same under like conditions. The results desired and obtained in the pharmaceutical practice can be but approximate, and, consequently, the apparatus need not be of exceptional accuracy. To obtain exceedingly fine results would require fine, delicate, and accurate apparatus, principally scale, weights, and thermometer, all beyond the means of the general pharmacist. Furthermore, it would be necessary to consider the forces, temperature, and atmospheric pressure, and the influences exerted by these during operation. Some basis for comparison must be adopted, but this basis must be definitely stated and remain such for the determination of specific gravity of all pharmacopoeial preparations. This standard of comparison by universal custom and consent is that of pure water, free from air, necessarily distilled, and recently boiled. The standard temperature adopted by scientists is 4° C. = 39.2° F. In every-day practice, this temperature is not convenient for weighing liquids, requiring their cooling with consequent loss of time and involving considerable labor. It is, therefore, desirable to adopt a temperature more readily commanded during the year, namely, 20° C. = 68° F. The specific gravity of liquids of the Pharmacopoeia should therefore be determined in comparison with water at the temperature of 20° C. taken as unity. It would be utterly impracticable to force upon the pharmacist the determination of specific gravities upon a strictly scientific basis. It would involve the specification of the size and nature of the specific-gravity flask, the coefficient of expansion, both of vessel and water, for every degree of temperature, and the consideration of atmospheric pressure and thermometric corrections. Thus 1 volume of water at 4° C. is increased to 1.000848 volumes at 15° C.; to 1.00179 volumes at 20° C. This 1 volume at 4° C. is considered unity, and specific gravity 1.0000. The increase of volume at 15° C. (0.000848) would, according to the general principle, $\text{Abs. W.} = \text{vol.} \times \text{spec. grav.}$ expressed in the corresponding weight, weigh 0.000848, and the specific gravity of the same volume at 15° C. be 0.999152. The correction necessary, owing to expansion of the glass, would be computed for 11° C. at 0.00254 for each 1° C., reducing the specific gravity to 0.998726; the calculation being based under standard barometric pressure of 30 inches (760 Mm.) The errors arising from thermometric inaccuracies, especially in a long range of degrees, are considerable. To guard against them requires careful and skilful manipulation and special apartments for performing the operation. The pharmacist in general will find it next to impossible to determine specific gravities under these conditions. The adoption of 20° C. for temperature, and considering water as unity at that temperature, making no allowance for expansion, will make the determination of specific gravities feasible and practicable.

Gallon, U. S.—The standard gallon is not a measure of great precision, since the weight of a cubic inch or other linearly-measured volume of water is not accurately known. The systems of weight and measure have come to us by inheritance from the English, and until the question is settled by legal enactments, the gallon and other measures of capacity will remain a variable quantity. The systems of weight and measure are derived from a measure of length; and this measure of length, which is the

yard of 36 inches, is only legal by custom and not by enactment of Congress. The actual standards of length used have within the last few years been compared and verified. The relation of the yard to the meter has been determined with definite and accurate results, and establishing a basis for weight and measure. (See Bulletin No. 9, O. H. Tittmann, U. S. Coast and Geodetic Survey.)

Drops.—The quantity known as a drop should be discarded. The conditions which influence the size and weight of drops are too variable; temperature being the greatest factor to change the volume, even from the same container. The laws of specific gravity and volume clearly demonstrate this fact.

Percolation.—Past experience has shown that considerable judgment is required in selecting a percolator for the process of percolation, the shape varying with the preparation intended. The only suggestion that might be offered consists in recommending the neck presented in the "Oldberg percolator" for all.

As to the application of the process to all drugs, much has been said, and it would be well for the Committee on Revision to thoroughly consider the remarks and experience offered by Messrs. Rother and Tscheppe.

As to the difficulty of obtaining a powder of the proper fineness, it must be said to be rather imaginary. With perseverance the object can be accomplished, although very tedious in many instances. It must be admitted that increased fineness readily results, but by using a sieve having 10 *meshes* LESS to the *inch* than the prescribed fineness, and then repowdering the whole to the desired fineness, the excess in fineness will not exceed five per cent.

Precipitation.—Dietrich's method of precipitation unquestionably produces finer and more readily-washed precipitates than those obtained without the method of dilution. The method is not applicable in all instances, for the reason that it is not a matter of indifference which of the two liquids acts as precipitant. The method of application depends upon the object desired and the nature of the compound produced.

Preparations.—Drugs entering into such class of preparations as abstracts, fluid extracts, extracts, and tinctures, are of a complex nature and necessarily produce complex solutions. The soluble constituents, both active and inert, possess different degrees of solubility, and may, owing to this property, be separated by changing the solvent. It therefore follows that if the solvent varies, the resultant product must vary and possess different therapeutic properties, and any decrease in power must be followed by a corresponding increase in dose. Were this the only consideration, the weaker preparation might be discarded but for the advantage that these weak preparations possess over the stronger, being miscible with preparations containing considerable water. It naturally follows that the menstruum must be of various strengths for the extraction of the same drug for different purposes. It likewise follows that the process and the details of said processes must differ. Water meeting the requirements of the U. S. Pharmacopœia is sufficiently pure to serve for all pharmacopœial preparations.

Solution and Solubilities.—Solution, whether simple or compound, is governed by certain laws and is facilitated by various causes, notably temperature and mechanical division. The "Table of Solubilities" should be based upon saturated solutions produced under like conditions and at a common temperature (same temperature as under spec. grav. 20° C.).

Tests.—It seems strange that any doubt should exist in the strength of solutions used in testing. Under the "List of Reagents" these are given in different strengths, and these are intended whenever mentioned under pharmacopœial preparations.

Analysis.—Elementary instruction on the subject of volumetric solutions, etc., seems out of place. We might as well ask for reactions and equations under all tests of identity, purity, and strength of a drug.

Alkaloid Reactions.—Experience alone can prove whether these are practicable and serviceable to the pharmacist.

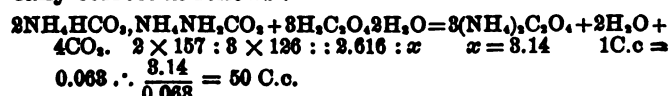
Limit of Reactions.—The same is true of this article.

Synonyms.—The proposition to quote the official Latin names of the Germ. Pharm. should not be adopted, since it defeats the object of synonyms as understood at present.

II. SPECIAL TOPICS.

Ammonii Benzoas.—The preparation is so simple that a formula should be given: Ammonii carbonas, 157 parts, dissolved and rendered alkaline by 200 parts aqua ammoniæ, is added to 122 parts benzoic acid dissolved in 400 parts alcohol. Evaporate with gentle heat.

Ammonii Carbonas.—The test for strength is theoretically correct as follows:



Practically the quantities are less, probably owing to the varying composition of the carbonate.

Ammonii Chloridum.—Purification: Saturated solution supersaturated with water of ammonia, set aside forty-eight hours, filtered, and then evaporated to crystallization. The test for iron cannot be too rigorous.

Ammonii Iodidum.—Colored ammonium iodide placed under a bell jar, beside a small dish containing water of ammonia, will soon assume its original color.

Ammonii Nitras should be discarded.

Ammonii Valerianas.—The commercial salt, as it is usually the acid salt, should therefore be neutralized with NH_4HO .

Calx Chlorata.—The pharmacopœial test for strength is very good and accurate, but the commercial article gives better results than 25 per cent available chlorine.

Calx Sulphurata.—The composition of this preparation should be definitely stated. The medicinal activity depends upon the quantity of CaS present. According to the test for strength the formula would be $3\text{CaS} + \text{CaSO}_4$. The process mentioned on page 326 U. S. Disp. is far better. The reaction for process is wrong. The proportions yield better results than those recommended by Dymond. The test for strength is proper and gives good results.

Calcii Bromidum.—One Gm. of the salt produces 1.878 Gm. bromide silver.

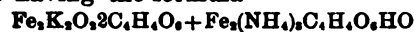
Ferrum Reductum.—The per cent of metallic iron is too low. U. S. P. test indicates 77.27 per cent.

Ferri Carbonas Saccharatus.—The per cent of ferrous carbonate is altogether too low—35 per cent can be obtained if the process is carefully followed. The test for strength according to the U. S. P. is 14.467 per cent. The washing should be made with water containing a small per cent of sugar.

Ferri Chloridum.—Remarks on the liquor ferri chloridi apply to this preparation.

Ferri et Ammonii Tartras.—In this preparation one-half of the tartaric acid should be neutralized by a solution of the official carbonate of ammonium in NH_4HO ; the composition of the scale salt being $\text{Fe}''', \text{Am}_2\text{O}_2, 2\text{C}_2\text{H}_3\text{O}_4, \text{H}_2\text{O}$.

Ferri et Potassii Tartras.—Another compound of indefinite character, like all other ammonio-scaled salts. The addition of ammonia to the insoluble ferric tartrate must produce a ferric ammonio-hydrato-tartrate, the finished compound having the formula



Ferri Hypophosphis.—I never could comprehend why a ferric salt should be prepared from a ferrous salt by double decomposition without subsequent oxidation, direct or indirect. I believe the ferrous salt was intended originally.

Ferri Iodidum Saccharatum.—This preparation should contain at least 30.91 per cent of ferrous iodide to conform with the molecular weight. The present strength of the official salt is 18.5 per cent. Moisture and light influence the preparation. Should be kept in the dark, in well-filled bottles, and in a dry place.

Ferri Lactas.—This preparation should be made by double decomposition of calcium lactate and ferrous sulphate. The salt prepared from iron and acid always contains partially oxidized salt.

Ferri Oxalas.—Ignition will produce 49.3 per cent residue, consisting of ferric oxide.

Ferri Oxidum Hydratum should be discarded.

Ferri Oxidum Hydratum cum Magnesia.—The solutions for the extemporaneous preparation should always be kept on hand. The resultant compound is an excellent antidote, containing ferric hydrate, magnesium sulphate, and magnesia.

Ferri Sulphas.—The directions for testing of strength are incorrect. Acidulating with sulphuric acid is not sufficient; the quantity necessary for complete oxidation is considerable, and should, therefore, read "in excess," or, better still, specify the quantity. Furthermore, the method of ascertaining the strength is a circuitous one. A definite quantity of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ in an excess of H_2SO_4 requires a definite quantity of the volumetric solution of potassium bichromate for complete oxidation (verified by ferridcyanide of potassium), and will indicate the percentage of pure salt.

Liquor Acidi Arseniosi should contain 1 per cent arsenious acid, and will then require 49.9 C.c. of the volumetric solution of iodine, provided the solution is perfectly alkaline. The quantity of bicarbonate of sodium should be increased to 2.00 Gm. The hydriodic acid produced requires nearly 0.5 Gm. for neutralization; hydrochloric acid (2 per cent) requires 0.4 Gm. for neutralization; arsenic acid produced requires nearly 0.3 Gm. for neutralization; total, 1.2 Gm., for uniformity's sake to be increased to 2.00. The U. S. P. allowance of 3 per cent is too great. The sublimed arsenious acid which should enter into this preparation will vary from 99 to 100 per cent. The powdered form varies from 60 to 85 per cent.

Liquor Ammonii Acetatis.—A solution containing 7.85 per cent ammonium acetate, or containing 9.1 per cent. acetate according to the extemporaneous formula. Specific gravity is too high and variable, on account of free CO_2 gas. The solution should be acid, otherwise it may precipitate alkaloidal salts, tartar emetic, etc.

The solution should be increased four to five times in strength to increase its keeping qualities.

Liquor Arsenii et Hydrargyri Iodidi.—A solution containing 1 per cent of iodide of arsenic and 1 per cent bi-iodide of mercury.

Iodine.....	25.0
Arsenious Acid.....	6.5
Corrosive Sublimate.....	18.
Iodide of Potassium.....	22.0
Distilled Water.....	q. s. to make 3,000 parts.

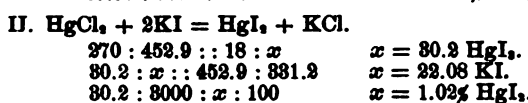
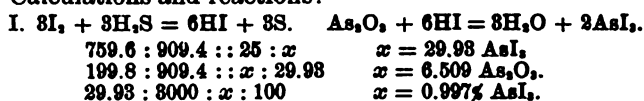
I. Dissolve the iodine in 300 parts of alcohol; pass H_2S gas through the solution until the color of iodine is dissipated; filter; heat the filtrate gently on a water-bath until the odor of H_2S is removed; continue heating on bath; add the sublimed arsenious acid in powder form gradually, under constant stirring, until complete solution is effected, the evaporated alcohol being gradually replaced by distilled water.

II. Dissolve the corrosive sublimate in 300 parts of distilled water, the potassium iodide in 60 parts of distilled water; filter the solutions separately; wash each filter with 100 parts of water (distilled); add the solution of $HgCl_2$ to the solution of KI ; collect the precipitate; wash with distilled water until the washings cease to produce a turbidity with test solution of silver nitrate.

III. Triturate II. with I.; add sufficient distilled water to make 3,000 parts.

Result: Solution containing 0.997 per cent AsI_3 and 1.02 per cent HgI_2 .

Calculations and reactions:



Liquor Calcis.—A solution said to contain 0.15 per cent Ca_2HO . The percentage of calcium hydrate varies with the temperature and time of contact, and therefore this should be specified in the formula. The process being one of a chemical nature, the title should be *Liquor Calcii Hydratis*.

Liquor Ferri Acetatis.—Text on page 196, first word on line 9 should be hydrate. The precipitate is finer and more readily washed by diluting both solutions tenfold. To prevent oxidation, the water should be previously boiled in bottles completely filled, then corked and cooled to 35° F. The same kind of water should be used for washing. The quantity of water of ammonia in the formula should be 75 instead of 80.

Liquor Ferri Chloridi.—The calculations as to the quantities of hydrochloric acid and nitric acid should be based upon iron as pure. According to the pharmacopoeial formula, 13 per cent is allowed for impurity and non-solution, which is altogether too much. Solution of ferrous chloride should be made with hydrochloric acid in three instalments, each diluted with 30 per cent of water, made in the cold, filtering and then boiling. By this method, the ferrous chloride formed is kept in solution, as there is no loss of water by evaporation, and the iron brought to complete solution by the action of successive portions of solvent. The strength of the solution is increased.

Liquor Ferri Citratis.—The precipitate of ferric hydrate should be prepared as suggested under "Acetate." The quantity of citric acid should be slightly increased.

Liquor Ferri et Quininae Citratis.—The correctness of the pharmacopoeial formula has never been questioned (I believe), nor is it probable that it will be as long as the composition of citrate of iron and ammonium remains uncertain.

According to the U. S. P., "Ferri et Ammonii Citras" is prepared by mixing 3 parts of a solution of ferric citrate, containing 35.5 per cent of anhydrous salt, with 1 part of water of ammonia. The official formula of the anhydrous salt is given as $Fe_2(C_6H_5O_7)_3$, molecular weight 489.3. The quantity contained in 3 parts of solution amounts to 1.065 parts, which would require 0.913 part citric acid for its production.

To neutralize this quantity of citric acid with aqua ammonia would require 2.217 parts.

We are told that citric acid is tribasic and tetratomic, containing, in addition to its three carboxyl groups, one alcoholic hydroxyl group. The hydrogen of these carboxyl groups is said to be replaceable by metals; likewise the hydroxyl of the carboxyl is replaceable by NH_2 . In the same manner, the hydrogen of the alcoholic hydroxyl group is replaceable by ammonia. In the soluble citrate of iron, such displacements do not seem to take place. The formation of hydrato-citrates appears more rational. The relation between hydrato-citrates and citrates being the same as that of oxyhydrates to hydrates, the question that arises is, Does 1 molecule of ferric citrate combine with 1, 2, 3, or n molecules of ammonium hydrate? Quantities, taken in proportion to the molecular weight, produced 130-140-150 grains of scaled salt, varying but little from the theoretical quantities, and indicat-

ing the formation of mono-, di-, and tri-ammonio-ferric citrate. Accordingly, the U. S. P. formula can only produce properly the di-ammonio-salt with an excess of 0.26 part of water of ammonia. In the process of scaling, this excess of water of ammonia is apparently not volatilized, indicating a proneness to form the tri-ammonio-salt. The mono-, di-, and tri-ammonio-salts, prepared upon theoretical quantities, possessed different degrees of solubility, the tri-ammonio-ferric citrate being the most soluble. From the foregoing results it was presumed (by the writer) that this latter salt was intended, and consequently all calculations in the preparation for liquor ferri et quininae citratis were based upon this salt.

In the preparation of this solution, the directions necessitate the production of a solution of citrate of iron and ammonium in water, to which citric acid is added; and, when it is dissolved, quinine is added, which is likewise intended to be dissolved. The first step in the process would be explained by the following reaction:



The 65 parts of iron salt would require 22.95 parts of citric acid. The prescribed quantity is 28 parts, the remaining 5.05 parts of citric acid being intended for quinine.

The basic citrate of quinine would require 3.683 parts of citric acid, the neutral citrate requires 4.91 parts, and the acid citrate requires 7.36 parts.

The solution will consequently contain the double salt, neutral ferric ammonium citrate and neutral citrate of quinine, with a slight excess of citric acid (0.14 part), and expressed by the following formula:



If, however, the di-ammonio-ferric-hydrato-citrate is considered the officinal salt, the result will be different. In this case the quantity of prescribed quinine will be absorbed in part as basic citrate of quinine, the residue—most probably in solution as a hydrato compound in excess of ammonio—forming a compound in the finished product represented by the formula



appearing as semi-transparent, thin scales, of a dirty red-brown color. The importance of definitely stating in the officinal formula the composition of the product is apparent.

Liquor Ferri Nitratis should be discarded, as there is little demand for it and it readily decomposes.

Liquor Ferri Subsulphatis.—I never succeeded in obtaining pharmacopoeial strength. The strength was always short. In the process I found the prescribed quantity too large.

Liquor Ferri Tersulphatis.—The quantity of nitric acid is too large.

Liquor Gutta-Perchæ should be discarded.

Liquor Hydrargyri Nitratis.—Moerck is correct in his statements. The solution made with 33.66 per cent of nitric acid does not decompose, but in the course of six months the nitrate crystallizes out. A solution of two years' standing showed decomposition with the formation of metallic mercury.

Liquor Magnesii Citratis.—Found no trouble in the officinal formula. Increased the per cent of citric acid slightly. Prepare the solution from calcined magnesia.

Liquor Pepsini.—Its classification under mixtures would be more appropriate. The strength should be regulated to the maximum dose of pepsin.

Liquor Plumbi Subacetatis.—According to the U. S. P. formula, the change of color is usually produced by three-quarter hour's boiling.

Liquor Potassæ.—The title should be liquor potassii hydratis.

Liquor Potassii Arsenitis.—If the preparation is true to its name, then the U. S. P. should state that the solution contains 1.656 per cent potassium di-hydrogen arsenite, equivalent to 1 per cent pure arsenious acid. For other suggestions see "Liquor Acidi Arseniosi."

Liquor Potassii Citratis.—The presence of free carbonic acid gas is desired, and consequently the formula should be one of extemporaneous nature. In the officinal formula, the citric acid is almost completely neutralized by bicarbonate of potassium—not the physician's desire. Mohr's "Pharmaceutische Technik" may be consulted upon the subject.

Liquor Sodæ.—Title should conform with the potassa preparation.

Liquor Sodæ Chloratæ.—Chlorinated lime always contains carbonate and hydrate, consequently varying proportions of these require different quantities of Na_2CO_3 in the preparation of liquor sodæ chloratæ. The quantity (100 parts) should be increased to 120.

Liquor Sodii Arseniatis.—Error in title on pages 96 and 235 of the Digest. Should be discarded.

Liquor Sodii Silicatis should be discarded.

Liquor Zinci Chloridi should be discarded.

The Preservation and Sterilization of Cows' Milk.

THE following is an abstract of a chapter on this subject, taken from a recently published work by Dr. Fr. Jos. Herz, of Cologne.*

a. Preservation of Milk without Foreign Additions.

When a sample of milk is to be preserved in the laboratory for purposes of analysis, the most simple and natural way is to expose it to cold. Below 10° C. the lactic acid ferment, upon the propagation of which the gelatinization of milk mostly depends, is so little capable of development that scarcely any change goes on in the milk.

Allen recommends to preserve milk for this purpose by adding to it twice its weight of wood alcohol. Richmond adds to fresh milk 0.5 per cent of commercial hydrofluoric acid.

To preserve milk for domestic purposes, it is necessary either to destroy all ferment spores or to render them quiescent. This may be accomplished either by great cold or, better, by great heat. Upon some transatlantic steamship lines, fresh milk is rapidly brought to freezing and kept in this condition until wanted. According to Vieth, this frozen milk separates gradually some of its cream, which latter cannot be again thoroughly incorporated with it.

The application of heat results either in the preparation of a condensed, viscid product (condensed milk), or its object is simply the destruction of the ferment spores without removal of water.

Gay-Lussac found, as early as 1810, that cows' milk may be kept sweet for two months if it be exposed, at first once daily, afterwards once every two days, to the temperature of a boiling solution of common salt.

Various methods and forms of apparatus have at different times been proposed for sterilizing milk by heat. The author enumerates many of these, but they may be omitted here. The most simple and efficient process, according to him, is the following, which is especially to be recommended when milk is to be prepared for infants' diet:

Pour the milk—either pure or mixed with such proportions of water, milk-sugar, etc., as may be directed by the physician—into perfectly clean soda-water bottles, so as to fill them within about one inch of the cork when inserted. Do not use rubber stoppers, as this will impart a flavor to the milk. Tie down the corks with cord, and place the bottles, either upright or on their side, into cold water contained in a suitable vessel provided with cover. Heat the water to boiling and keep it so for forty-five minutes. Then remove the bottles, place them in the cellar, warm them, as wanted, by placing them into water heated to the temperature of the body, and then (not before) remove the cork. Most bottles will stand this heating. Still it is well to test them previously by a blank experiment—filling the bottles with water instead of milk. Milk thus prepared may be kept for weeks. To neglect the sterilization of milk to be used for children is an absolute crime against their well-being. The air of stables, cows' dung, storage in unsuitable places, and other causes are instrumental in impregnating milk with germs which are apt to produce disease, but which may be destroyed by boiling.

In Lower Bavaria "sour milk" is preserved in a peculiar manner. Since most cows calve toward spring, there is less milk available during winter, and for this reason a beginning is made during autumn to collect whatever milk may be spared each day, in a large wooden tub in the store-room. Whenever fresh milk is added, the whole is well stirred, and again covered with a wooden lid, or with a cloth, to keep out mice, cats, etc. Juniper berries are added as a condiment. Grapes (whole) are likewise added by many. It would be interesting to obtain some definite information regarding the process and products of fermentation; at all events, the temperature (winter time) must have something to do with it. The lactic acid ferment itself reduces most decidedly the vitality of other ferments or spores, and the lactic acid itself acts partly as a preservative.

b. Preservation of Milk by means of various Additions.

In Norway, northern Sweden, and Finland, "long milk" (långmjölk or taetmjölk) is a very common article. It is of the consistence of a soft jelly, and may be drawn out in threads. A small quantity of it added to fresh milk will convert the latter within forty-eight hours into "long milk." It is obtained either by feeding to the cows some butterwort (*Pinguicula vulgaris* or *P. alpina*), or by hanging a bunch of these plants for some time in the milk.

Various preservative agents have been recommended at different times. Among these, the principal ones are boric acid, borax, boroglyceride, salicylic, benzoic, and sulphurous acids, and their salts. Boric acid is said to have first been recommended by Jacques in 1858. According to Fleischmann, 1 Gm. of boric acid—or 1.5 Gm. of borax—is sufficient to keep 1 Kgm. of milk during one week from turning sour. Milk preserved with boric acid does not readily yield up its butter. Addition of borax imparts to it a slightly yellow tint and a soapy taste. Boroglyceride

must be used in larger quantity, 1 liter of milk requiring about 6 Gm. [These data are given in abstract.]

The use of boric acid for the purpose of preserving milk is, however, to be condemned, since it acts injuriously upon the digestion.

Meissl has devised a process for recognizing so small a quantity as 0.001 to 0.002 per cent of boric acid when added to milk. For this purpose, 100 C.c. of the latter are rendered alkaline with milk of lime, evaporated to dryness, the residue ignited, the ash dissolved in the smallest possible quantity of hydrochloric acid, the solution filtered, completely dried, and the residue moistened with highly diluted hydrochloric acid. The mass is then impregnated with tincture of turmeric (1 part of ground turmeric digested at a gentle heat with 6 parts of weak alcohol), and dried on a water-bath. If boric acid is present, even only in traces, the dry mass has a distinct cinnabar-to-cherry-red color. The ash may further be tested for boric acid by the flame reaction.

Sulmann and Berry have shown that both benzoic and salicylic acids are without value as preservatives for milk, and that benzoate of sodium is preferable. If salicylic acid is added in quantity sufficient to accomplish the purpose, it will be distinctly detected by the taste. (The same is, no doubt, the case with benzoic acid.)

Benzoic acid is best detected in milk in the following manner: 250 to 500 C.c. of the milk are rendered alkaline with a few drops of lime- or baryta-solution, evaporated to about one-fourth, then mixed with sand or pumice, and evaporated to dryness on a water-bath. The finely-powdered mass is moistened with dilute sulphuric acid and then extracted 3 or 4 times with 50% alcohol. The united alcoholic solutions are neutralized with baryta water and evaporated to a small volume. The liquid is then acidulated with dilute sulphuric acid and shaken with ether, upon the evaporation of which nearly pure benzoic acid will remain behind, which may be further dried at a moderate heat and weighed. It is best to sublime it, on the water-bath, upon a watch glass, then to dry again by warming, and to weigh again. Its identity, by means of solution of ferric chloride—which produces a characteristic buff-colored precipitate—is best established by first adding to the aqueous solution of the benzoic acid a drop of solution of acetate of sodium before adding the ferric chloride.

Salicylic acid is detected in the following manner:

One hundred C.c. of milk are shaken with 100 C.c. of water at 60° C., 5 drops of acetic acid, and 5 drops of a solution of mercuric nitrate. The clear filtrate obtained from this is then shaken with 50 C.c. of ether. The ethereal solution is evaporated, and the residue tested with a highly dilute (1% or less) solution of ferric chloride, which produces a violet tint if salicylic acid was present. As the quantity is too small for weighing, it may be estimated approximately by comparing the tint obtained in the iron reaction with that produced in a solution of known strength.

Saccharin, hyposulphite of sodium, and various other substances which have been recommended for this purpose, and which the author treats of, may be omitted here.

Of course it is to be distinctly understood that the author does not recommend any of these preservative agents. His object is merely to enumerate them and to show how they may be detected.

Soda, in the form of carbonate or bicarbonate, and also the carbonates of potassium, ammonium, and calcium, are reputed to be preservatives of milk, though in reality they are not. Since these agents neutralize any free acid which may gradually be formed, the liquid thereby becomes actually a much better nourisher of spores and bacteria.

In France, peasants are permitted to add to every 20 liters of milk 100 C.c. of a 9.5-per-cent solution of bicarbonate of sodium. But such an addition is well known to be injurious to children.

To detect soda, Soxhlet and Scheibe recommend to estimate the amount of carbonic acid contained in 300 to 500 C.c. of milk. If it materially exceeds 2 per cent, an alkaline carbonate has been added.

Schmidt detects soda by mixing 10 C.c. of milk with 10 C.c. of alcohol, and then adding a few drops of solution of rosolic acid (1 in 100). Pure milk turns brownish-yellow; if the milk contains carbonate or bicarbonate of sodium, it acquires a more or less deep rose-red tint.

New Test for Albumin.—Salicylsulphonic acid has been recommended by Mr. Roch as a certain, delicate, and convenient test for albumin (*Pharm. Centralh.*, September 19th, page 549). The albumin is said to be thrown down by the acid as a white powder, having an acid reaction, and giving with ferric chloride an intense red color. The separation of albumin from a liquid is stated to be complete, 0.0005 Gm. in 10 C.c. being distinctly recognizable. On examining urine, it is recommended to introduce a few crystals of the acid into a cubic centimeter of the liquid, and shake, when the occurrence of turbidity may be taken as evidence of the presence of albumin, since the reaction is not affected by the presence of urea, uric acid, peptones, or glucose.—*Pharm. Journ.*, November 30th.

* Die gerichtliche Untersuchung der Kuhmilch sowie deren Beurtheilung (With cuts, tables, etc.) 8vo, Berlin & Neuwied, 1889.

FILTERING ARRANGEMENT.

MR. C. R. GYZANDER sends the following communication to the *Chemical News* (October 4th):

A filter support, which is an improvement on the arrangement for rapid filtration described by Mr. R. A. Fessenden in the *Chemical News*, vol. ix., page 102, is shown in accompanying sketch. It is made from platinum wire, or any other suitable material, and bent in the shape shown in Fig. 1.

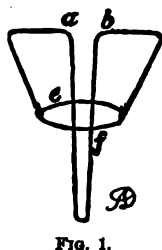


FIG. 1.

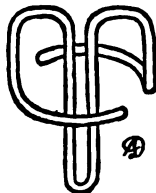


FIG. 3.

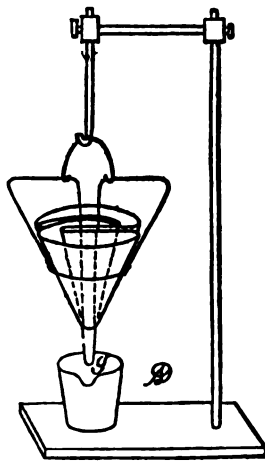
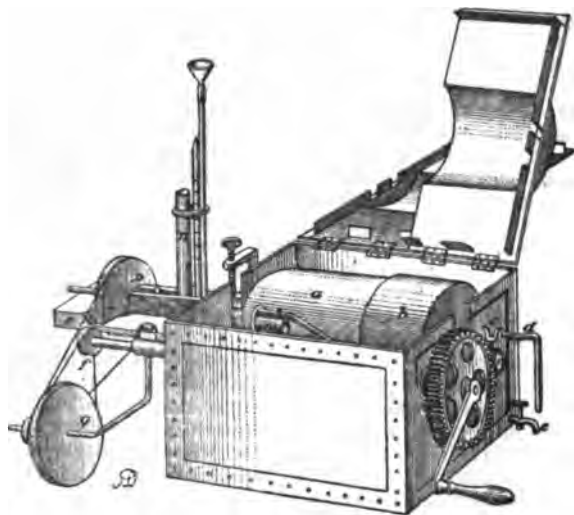


FIG. 2.

A paper, folded as described by Mr. Fessenden, is pushed in between the wires *a* and *b*, Fig. 1, which serves the same purpose as the glass rod, that is, to support the inner folds of the filter; whereas the ring *ef* supports the outer folds, giving the whole an appearance of a paper formed with two compartments. This may now be placed in a glass funnel, or used alone, simply by suspending it over the beaker, as in Fig. 2, the liquid following the wire and dripping from the point *g*.

As a means of drying precipitates on the filter, it is far superior to the old way of placing the glass funnel with its filter in the drying oven, as the air has access to the paper from all sides, whereby it dries much more rapidly and thoroughly. For a 7½-inch filter, a support of ¼-inch platinum wire, with the ring *ef* 2½ inches in diameter, and the wires *a* and *b* 3 inches long, gave excellent service. A glass rod, bent as indicated by Fig. 3, works very well.



A SHAKING APPARATUS.

JULIUS TAFEL has designed an apparatus by means of which a vessel containing a mixture may be subjected to a steady and continuous agitation. It is of especial value when a solid or semi-solid substance is to be mixed with a liquid, or when a gas is to be passed during the agitation. The vessel in which the mixture is contained holds five to six quarts. Having been properly covered with paper, it is placed into the frame *b*, and set in motion by means of a winch and cog-wheel. The iron box in which the frame rests may be filled with water (hot or cold), ice, or a freezing mixture, as the case may be, and may be closed by a lid, which is made in two sections so that a part may be kept open.

When it is desired to gradually introduce into the mixture, during the agitation, some powder, etc., the T-shaped attachment (see Fig. 2) is inserted into the latter. This consists of a T-tube, containing a corkscrew-shaped rod, which gradually pushes into the flask any powder which may be poured into *n*. This corkscrew-shaped propeller is set into a slow circular motion by the wheels *p* and *g*, with intermediate transmission.

Recently this apparatus has been further improved by making it suitable for the agitation of mixed liquids, such as are used in extracting alkaloids and fats. It has long been known that the time of making certain assays (for instance, morphine in opium) can be greatly shortened and a more perfect exhaustion obtained by prolonged agitation. For this reason an apparatus of the kind here shown will be of real benefit. It is comparatively cheap, according to the designer's statement (though no actual cost is given). It is made and sold by Franz Mueller (successor to Dr. H. Geissler), of Bonn, and may be imported through dealers

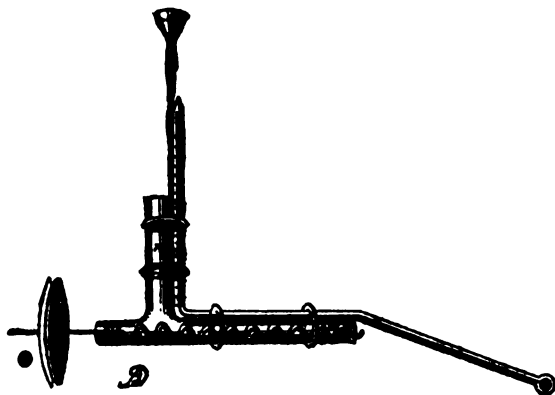


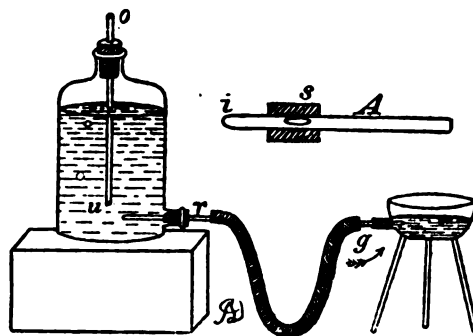
FIG. 2.

in chemical apparatus.—After *Ber. d. D. Chem. Ges. and Chem. Centralbl.*

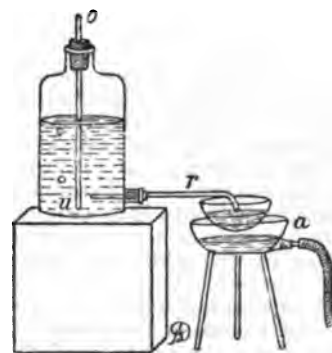
[Note by *Ed. Amer. Drugg.*—It would be an additional advantage if the apparatus could be kept in motion without manual labor. It would be a comparatively simple matter to apply an electric motor to it. In fact, for ordinary assay work, a much more compact apparatus, consisting of a small motor below a disc carrying a frame for the flask or flasks, would be amply sufficient.]

AUTOMATIC FILLING OF EVAPORATING DISHES.

WHEN a considerable quantity of a liquid is to be evaporated in a small capsule, an automatic arrangement for periodically refilling the capsule may be made in the manner shown in the cuts. In either case the principle is this, that as long as the outlet of the tube *r* is below the level of the liquid in the capsule, no liquid will flow from the reservoir. But as soon as the outlet becomes uncovered, the liquid will pass until the exit is below the level.



The tube passing through the tubulure near the bottom of the reservoir is recommended to have the shape shown in *A*. Its interior end is closed by fusion, but it has a hole blown into it a short distance from this end. When the tube



is pushed far enough through the cork to get the hole clear of the latter, the liquid will be able to pass. On drawing the tube out until the hole is covered by the cork, the flow will stop.

A stop-cock of this kind may be used in many ways.—After *Chem. Zeit.*, 13, 727.

Rubidium Bromide.

THE bromide of rubidium, as well as the double bromide of rubidium and ammonium, have been recommended as anti-epileptic remedies. It is said that they do not cause disagreeable secondary effects, and that they are in some [in which?] cases preferable to other bromides.

Rubidium bromide is quoted by Zimmer & Co. at 8 marks per 10 Gm., and ammonio-rubidium bromide (containing about one-fourth of its weight of the pure rubidium salt) at 2 marks per 10 Gm. This would make the price of the former, at the European manufacturer's place, about \$87 per pound. Certainly, this remedy will have to be reserved for those epileptics who can afford to pay for it.

Chloralamide.

THE results following the administration of the new hypnotic, chloralamide, to a number of hospital patients, have been communicated by Dr. D. R. Paterson, of Cardiff (*Lancet*, Oct. 26th, page 849). It was given in fourteen cases of insomnia, including simple sleeplessness and that consequent upon phthisis, heart disease, and enteric fever. Upon the whole, the results obtained were encouraging; for although the action of the amide is not quite so rapid as that of chloral hydrate—sleep coming on from half an hour to an hour after its administration—this is considered to be more than compensated for by the almost entire absence of action upon the circulation. The new hypnotic, however, appears to be not quite free from some of the disadvantages attending the use of others, since in some instances doses of 30 grains and 45 grains were followed by giddiness, feeling of sickness, dryness of mouth, and even slight delirium. As a rule, sleep lasting about eight hours followed its administration, and in cases of phthisis its influence in restraining sweating was very marked; but the insomnia and restlessness due to pain were little if at all affected by it. Dr. Paterson thinks some of the published doses to be much too large, at least to begin with, especially if the patient has been ill some time. He has found that usually from 30 to 45 grains are sufficient for a man, while 20 to 30 grains will give satisfactory results in a woman.—*Pharm. Journ.*, November 2d.

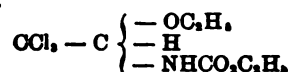
Sulphonal.

SULPHONAL constitutes the topic of three separate articles in the last number of the *Lancet* (November 23d, pages 1051 and 1053). In the first, Dr. R. Percy Smith deals with the question that has been raised as to whether a prolonged use of this hypnotic is altogether harmless. Reference is made to observers who have been inclined to attribute symptoms of giddiness and ataxic disturbance to its influence, and Dr. Smith quotes the symptoms observed in some cases under his care in Bethlehem Hospital as justifying the impression that it does in some cases interfere with the cortical motor functions. In all the cases, however, suspension of the administration of the sulphonal was attended by an immediate disappearance of the unpleasant symptoms, and, in some, readministration after an interval produced no bad effect. In the second paper, Dr. Sutherland reports that he has found sulphonal to be a most valuable sedative in chronic insanity where the attacks of excitement are recurrent; but in cases where the excitement is continuous its effects are apparently injurious by increasing the state of excitement of the patient the following day. A formula recommended by Dr. Sutherland for a draught is: Sulphonal, 20 grains; pulv. tragacanth, 20 grains; syrup aurantii, 1 drachm; water to 1 ounce. In the third paper, Mr. C. K. Bond arrives at the conclusion that sulphonal is of very great value in the insomnia of typhus, in inducing sleep without the disadvantage, attending the administration of some other hypnotics, of causing stupor leading up to coma.—*Pharm. Journ.*, November 30th.

Somnal.

SOMNAL is the suggestive name applied to what is described as "ethylirtes [ethylized] chloral-urethane," and represented by the formula $C_2H_5ClO_2N$ (*Pharm. Zeit.*, October 5th, page 611). It was at first described as being prepared from chloral, alcohol, and urethane, and as differing from the compound recently introduced as chloral-urethane by containing 2 C and 4 H more in the molecule; also as melting at 42° C., boiling in a vacuum at 145° C., and as not being altered by the addition of silver nitrate or by acids. As the crystals are very deliquescent, the preparation appears to be sent out dissolved in alcohol, in which it is soluble to the extent of three parts in one. The advantage claimed for somnal is that when administered in 2 Gm. doses, it induces within half an hour a quiet sleep that lasts from six to eight hours without any inconvenient by-effects. It is not unimportant to add, however, that Mr. Lutze, writing to the *Pharmaceutische Zeitung* (October 26th, page 652), has claimed that somnal is none other than chloral-urethane under a new name, and that the addition of the word "ethylirtes" is simply a blind. This statement has, however, evoked a denial from Mr. Rad-

lauer, who now affirms that it is a product of the direct combination of chloral alcoholate and urethane in a vacuum apparatus, and that its composition is correctly represented by the formula



—*Pharm. Journ.*, November 2d.

Annidalin—A Proposed Substitute for Iodoform.

THE reactions that take place between iodine and compounds of the phenol group in the presence of an alkali have been studied by Messrs. Messinger and Vortmann, who describe a number of new compounds, one of which it is proposed to introduce as a substitute for iodoform. Upon adding solution of iodine in potassium iodide to an alkaline solution of phenol, in the proportions of 8 atoms of iodine to 1 molecule of phenol and 4 molecules of potassium hydrate, and heating the mixture to 50° or 60° C., a dark red, non-crystalline precipitate falls, which has the composition of di-iod-phenol-iodide ($C_6H_2I_3O$), and is apparently isomeric with the already known white tri-iod-phenol, into which it is easily converted by boiling in potash solution and reprecipitation from solution by an acid. When dry, the new compound is violet colored, odorless, insoluble in water and dilute acids, soluble in alcohol with a red color, and freely soluble in benzol and chloroform. The cresols form analogous compounds. Thymol combines in the proportion of 3 atoms of iodine to 2 molecules of thymol, the product being probably a dithymol compound. When properly prepared it is red, and will retain this color several months if kept dry and protected from light; but in contact with moisture it is readily decomposed, giving off iodine and passing into a pale yellow compound containing only 2 atoms of iodine to the double molecule of thymol. It is the red compound apparently which it is proposed to introduce as a substitute for iodoform, under the name "annidalin." It is described as being amorphous, insoluble in water, slightly soluble in alcohol, and freely soluble in ether and chloroform. Resorcin treated similarly yields a di-iod-resorcin iodide, while the oxybenzoic acids form alkali salts of corresponding di-iodized acids, the compound with salicylic acid being represented by the formula $C_6H_3I_2O_4$ $\begin{smallmatrix} \diagup OI \\ \diagdown COOK \end{smallmatrix}$, and containing 59.3 per cent of iodine.—*Pharm. Jour.*

Atropine, Hyoscyamine, and Hyoscine.

EXPERIMENTS made by Professor Schmidt (*Pharm. Zeit.*, Sept. 25th, page 583) seem to establish the fact that the length of time belladonna roots are kept after collection has little influence on the alkaloid they contain, as practically only hyoscyamine, and no atropine, is found in full-grown roots that have been kept for years. On the other hand, there appears to be some relation between the alkaloidal contents and the stage of growth; for whilst in roots of one year's growth free atropine occurs together with hyoscyamine, only hyoscyamine is present in fresh old roots. Professor Schmidt also reports that he has now found that *Scopolia atropoides*, like *S. japonica*, contains both hyoscyamine and hyoscine, and that hyoscine, hitherto known only as a syrup, has been obtained in a crystalline form by Mr. Bender. Traces of an alkaloid having a mydriatic action have also been found in *Solanum tuberosum*, *S. nigrum*, and *Lycium barbarum*. From the residues of the conversion of hyoscyamine into atropine by Will's process, a crystalline compound has been separated presenting some analogies to isatropine, the decomposition product (tropine) of hyoscine, but differing from it in crystalline form. Its occurrence suggests the possibility of the formation of another base, besides atropine, during the conversion, and it has been named "metatropine." In reference to the commercial preparations sold under the names "atropine" and "hyoscyamine," Professor Schmidt remarks that they are usually mixtures, and physiological experiments have hardly yet been made with the pure compounds. He mentioned that the more hyoscyamine sulphate a sample of atropine sulphate contains the finer would be its crystalline appearance, whilst the samples occurring as white granular masses would contain more atropine sulphate. Further, if a solution of hyoscyamine sulphate containing atropine sulphate be allowed to evaporate spontaneously, the hyoscyamine would gradually all be converted into atropine, as shown by a solution of the residue being inactive towards polarized light.—*Pharm. Journ.*, Nov. 2d.

Note on Guarana.

MR. FRANZ KELLER, in his work entitled "The Amazon and Madeira Rivers," has the following note on guaraná:

The guaraná, prepared from the fruit of the *Paullinia sorbilis*, is a hard, chocolate-brown mass, of a slightly bitter taste, and of no smell whatever. It is usually sold in cylindric pieces of from 10 inches to 1 foot in length, in which the half-bruised, almond-like seeds are still distinguishable; the more homogeneous and the harder the

mass the better is its quality. To render it eatable, or rather drinkable, it is rasped as fine as possible on the rough, bony roof of the mouth of the *sudis gigas* (pirá-ructi), and mixed with a little sugar and water. A teaspoonful in a cup of warm water is said to be an excellent remedy in slight attacks of ague.

The taste of this beverage, reminding one slightly of almonds, is very palatable; still it scarcely accounts for the passionate liking entertained for it by the inhabitants of the greater part of South America. It must be the stimulating effects of the paullinine it contains (an alkaloid like caffeine and theine) that render it so indispensable to those who have been accustomed to it. All the boats that come lightly freighted with ipecacuanha and deer or tiger hides from Mato Grosso down the Arinos and the Tapajoz, in face of the considerable cataracts and rapids of the latter, take their full loads of guaraná at Santarem; and the heavy boats of the Madeira also convey large quantities of it to Bolivia, for at Cuyabá, as well as at Santa Cruz de la Sierra and Cochabamba, there are many who cannot do without their guaraná, for which they often have to pay 30 francs per pound, and who prefer all the rigors of fasting to abstinence from their favorite beverage. On the other hand, the mestizo population on the Amazon, where it is prepared on a large scale by the half-civilized tribes of the Manubés and Mundurucús, and sold at about 3 francs per pound, are not so passionately attached to it; they rather take coffee and a sort of coarse chocolate which they manufacture for themselves.

Insects in Drugs.

AT a recent meeting of the Chemists' Assistants' Association, Mr. C. J. Strother showed a number of drugs infected with animal life, and remarked that the first, a fair-looking sample of crushed linseed, supplied about three weeks before by a large wholesale firm and kept in a wooden cask with a cover of wood, was seen under a lens to be literally alive. The next was aconite root, of which the parasite was quite different. *Nux vomica* and cantharides were the remaining specimens. With the last-named it is usual to put camphor, though with doubtful effect; but it is possible that washing hard substances in a solution of salicylic acid, and quickly drying them, might protect them. The question naturally arises, What would be the effect of a poultice containing thousands of insects applied to an open wound, especially if the poultice be made with hot instead of boiling water?—*Pharm. Jour.*

True and False Strophanthus Seed.

A RECENT editorial of the *Chemist and Druggist* contains some valuable information, partly furnished by an expert of high standing, regarding the identity or genuineness of a considerable portion of the present market supply of strophanthus seed. While it has several times occurred lately that a spurious strophanthus seed—now known to be derived from a *Holarrhena*—which is medicinally worthless, has been offered, a new kind has recently turned up which is believed to be derived from *Roupellia grata*, a plant nearly allied to strophanthus, though the absence of the pappus made it impossible for the expert to be entirely sure of this. The parcels containing this seed are composed of a mixture of about one-fifth of true *Strophanthus hispidus* seed and four-fifths of the new variety. These latter are perfectly smooth, are without the silky hairs which are characteristic of true strophanthus, hard, bright brown in color, and have on one side a grooved line, commencing at about one-third of the length of the seed from the base, and running thence to the top of the seed. Their taste, though bitter, is much less pronounced than that of the true strophanthus. The expert who was consulted believes these seeds to be identical with those known to French drug houses as "*Strophanthus glabré du Gabon*" (glabrous strophanthus from the Gaboon). A large consignment of these recently reached London from the port of Gaboon, west coast of Africa. The editorial from which we quote next says:

"It is well known that what we call the principal strophanthus seeds of commerce—the long, green or grayish-green, silky-haired, intensely bitter drug generally known as Kombé seeds—have for some time been extremely scarce, and are now worth from 14s. to 16s. per lb. in the market. These green Kombé seeds used to come to us mainly, if not exclusively, from the Shiré and Zambesi rivers to the coast. That source of supply has almost dried up since last year, though the pinch was not much felt until quite recently, as there had been an enormous over-supply, and the second-hand holders were able to fill the requirements of the trade for a long while after the direct imports had fallen off. Leaving France out of account for the moment, this green strophanthus is practically the only kind concerning the physiological action of which reports have been published by the eminent medical investigators who have created the reputation of the drug. To it, consequently, our present state of knowledge of the medicinal properties of the drug may be said to be confined. For this reason, no doubt, the new Austrian Pharmacopœia, the only European standard work of that kind in which

the drug strophanthus has been incorporated, distinctly rejects all varieties of the drug except the aforesaid Kombé seed, from which alone the tincture official in this Pharmacopœia may be prepared. This is a fact which must tell strongly against the value of the seed now under discussion, though of course it does not *per se* prove the latter to be valueless. But there are further points to be considered. The strophanthin isolated from the Kombé and hispidus seeds appears in an amorphous condition (Professor Fraser being the only one who has succeeded in obtaining it crystalline, although that is a little uncertain), while from the glabrous Gaboon seeds an active principle, strophanthin, is easily obtainable in crystalline form. Strophanthin, however, is not at present an article of commercial interest at all, but only a chemical curiosity, occasionally met with at exhibitions or in museums, and so far of little practical utility, though it is admitted to be an exceedingly active agent. In medicine strophanthus is used exclusively as a tincture prepared from the seed direct, and all our knowledge with regard to doses, activity, etc., is based upon the use of this tincture. Of the medicinal action of the strophanthin, on the other hand, no sufficient data have been given to justify its employment, and its administration, therefore, must at present be regarded as inadmissible."

Specific-gravity Bottles for Use in Tropical Climates.

MR. C. J. H. WARDEN describes, in the *Chemical News* of November 15th, a modification of specific-gravity bottle especially useful in a climate like that of Bengal, where, for the greater part of the year, the temperature ranges from 80° to 95° F. and the air is highly charged with moisture.

Under such conditions, when a specific-gravity bottle is filled with liquid cooled to 15.5° C., and the capillary-bore stopper inserted, the bottle cannot be immediately weighed, because, owing to the extreme humidity of the air, water is condensed on the surface of the bottle far too quickly to admit of even very rapid weighings; and by the time the temperature of the liquid has reached that of the balance case, it has necessarily expanded, and a large amount escaped through the capillary orifice in the stopper.

Mr. Warden obviates this difficulty by having a glass cap ground to fit the neck of the bottle, with a capillary opening in the top, which will hold the excess of liquid displaced by expansion. Such bottles are supplied by Mr. Edward Cetti, of Brooke street, London, E. C.

A Water-jacketed Flexible Tube.

FREDERICK J. SMITH communicates the following note to the *Chemical News* (October 18th):

It is often convenient to conduct gases through flexible tubes, but the convenience is not without its disadvantage, since some gases diffuse readily through rubber. Having to deal with electrolytic gas in a research on explosions in tubes, and believing that some error would be introduced by the use of rubber tubes as usually employed, I devised a flexible tube almost quite free from the disadvantage mentioned. As the device may possibly be of use in the laboratory, I venture to send a description of it to the *Chemical News*.

A length of small rubber tube is drawn through another tube of equal length but of greater diameter; each end is furnished with a small length of glass tube fitting the smaller tube; one end is bound off with cord, then the space between the inner and outer tube is filled with water or any liquid required; the other end is then bound off. By this means a water-jacketed flexible tube is easily constructed.

Glycerin as a Preservative of Sulphuretted Hydrogen Solution.

ALFRED J. SHILTON writes to the *Chemical News* (November 15th) as follows:

A number of conflicting statements have been made as to the action of glycerin on a solution of sulphuretted hydrogen. I think it was Lepage who first recommended its use in the laboratory for this purpose, but it has since then been denied to have any preservative action whatever. Perhaps the following simple experiment will clear up the matter once for all:

On November 5th I made up two white glass-stoppered bottles (a) and (b):

(a) Contained 50 C.c. saturated solution of sulphuretted hydrogen gas in water.

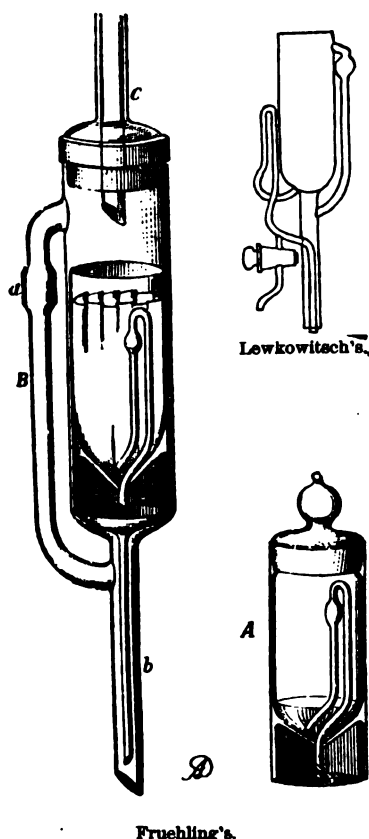
(b) Contained 50 C.c. of the same solution as in (a), but with 1 C.c. of glycerin in addition. The bottles were placed side by side on the laboratory shelf, and were left until December 31st; they were then opened, and each of them found to smell strongly of the gas and to give a precipitate with lead acetate solution. They were reclosed, and not again examined until March 30th. When opened on that date the bottle (a) had entirely lost its odor, and gave no precipitate with a salt of lead, but the bottle (b), which contained the glycerin, had a strong odor, and gave a copious precipitate with lead acetate.

A NEW treatment, introduced by Dr. Merget and adopted by a number of physicians, consists in causing the patients to wear on the skin flannel impregnated with finely divided metallic mercury. To enable pharmacists to readily prepare the flannel in question, Prof. P. Carles has published the following process: First select soft and thick flannel, and soak it for two or three hours in an alkaline bath consisting of 1 pound of carbonate of soda dissolved in 4 pints of water. The flannel, after one rinsing in cold water and a simple wringing, is now ready for the mercurous solution, which is made as follows: In a large porcelain dish place several pounds of quicksilver—enough to be sure of an excess—and add several pints of cold nitric acid diluted with water. No heat is to be applied, to insure the formation of mercurous nitrate. When the reaction has ceased—the dish having been set aside in open air or under a hood for twenty-four hours—should no crystals of nitrate appear, some concentrated nitric acid must be added and the operation continued. When crystals begin to form, it is a sign the solution is sufficiently concentrated, and the flannel, still moist and slightly alkaline, should then be dipped into it. After four or five hours' maceration, the fabric is withdrawn, allowed to drain off, and soaked for a few minutes in a third bath made with 1 part of ammonia and 2 of water. As soon as the tissue has turned a grayish-black color, it needs only drying in open air and protection from direct sunshine to be ready for use. The flannel thus prepared is employed as an improved substitute for mercurial ointment in local affections and in inhalations for general treatment. But as the patient must be exposed to mercurial vapors only and not to any flying metallic dust, the flannel should be incased within thin muslin or silk of a very close texture.

IMPROVED EXTRACTION APPARATUS.

THE number of different forms of extractors so far proposed or introduced is so large that one would scarcely expect any very material improvement. Yet every now and then a new form is suggested which is distinguished by some special useful feature. Unfortunately, it is hardly possible to combine *all* the best features of the different extractors into *one*. Hence analysts will continue to differ in their preferences for one or another form.

A very serviceable and practical extractor is that devised by R. Fruehling. The extractor proper is a separate, smaller cylinder, the wall of which is continued, below,



beyond the exit tube, so that it may be set upon the table or the scale. Moreover, it may be closed with an accurately fitting lid. Hence, after an extraction is completed, the inner vessel may be put into the drying-chamber, then stoppered, cooled in the desiccator, and weighed. The outer cylinder may be understood from the larger cut. Into its bottom is inserted a small, thin-stemmed funnel, the flaring edge of which is ribbed so as to permit the passage of vapors. —*Zeitschr. f. angew. Chem.*

[We would recommend that glass knobs be fused upon the inner cylinder so as to keep it, in all positions, equidistant from the walls of the outer one. —ED. AM. DRUGG.]

DR. LEWKOWITSCH prefers the modification of Soxhlet's extractor which is here illustrated. The improvement consists in

the attachment of a small stop-cock to the descending leg of the siphon, whereby small samples of the extracted liquid may be drawn off from time to time, in order to determine the rate or the completion of the extraction. —*J. Chem. Soc.*, 1889, 359.

KNOEFLE's apparatus consists of an outer and inner cylinder. The inner cylinder is shown in the smaller cut at the right. It contains a siphon in its interior, which causes the extraction of the fatty, etc., material to take place uninterruptedly. On the outside of this inner cylinder there are projecting glass knobs, which maintain a passage for the hot vapors between the outer and inner cylinders.

PROF. F. A. FLÜCKIGER recommends (in *Arch. d. Pharm.*, 227, 162) to cause the hot ether vapor to penetrate the powdered substance to be exhausted, then to become condensed and by a rapid cooling of the flask to cause the condensed ether to pass with force and rapidity through the powder again.

To accomplish this, there is fused upon the extractor A a lateral tube, B F, which is closed when the ether is to be made to return through the powder. The extractor has a septum at C, with an attached interior funnel tube. The extractor itself ends in a contracted portion, D, which passes through the cork of the flask. The substance to be extracted is packed upon the septum C, the orifice of C being lightly closed with some pure porous material (cotton, filter paper, glass pearls, etc.). The lateral tube B F ends in a projecting tube, G, provided interiorly with a notched cork, into which, from the outside, a correspondingly pointed cork, K, may be pushed, so that the inner orifice of the tube B F is closed. When the apparatus is started, the cork G is pushed in so as to prevent the passage of hot vapors by the lateral tube, whereupon the vapors are compelled to pass through C, penetrate the powder, and are again condensed. When sufficient liquid has collected on the surface, the flask is placed into cold water, and this causes the liquid to be forced through the powder. This process is repeated until the powder is exhausted. If the lateral tube B F is not closed by the stopper K, the vapors will, of course, pass through this tube to the condenser. —(Abstract.)

DR. L. H. FRIEDBURG has found a fat extractor constructed and used in the laboratory of Prof. A. Petermann, of Gembloux, Belgium, to possess decided advantages.

Among the latter are: (1) that no corks are used in connecting the different parts of the apparatus. Ether (and other volatile solvents) are apt to extract from cork a certain amount of fatty matter, which will increase the weight of the fat extracted from the analyzed substance. And (2) at the end of the operation, the ether which has been used for extraction is found in one flask, while the extracted fat, ready for weighing, is contained in the flask standing alongside the other, within the same apparatus.

The apparatus consists of the following parts:

1. A siphon digester, A, in which the substance to be analyzed is placed. The edge of the siphon has a rather broad rim, cut out symmetrically at three points.

2. Two little flasks, BB, one of which (of known weight) is destined to receive the extracted fat, while the other one contains the volatile solvent.

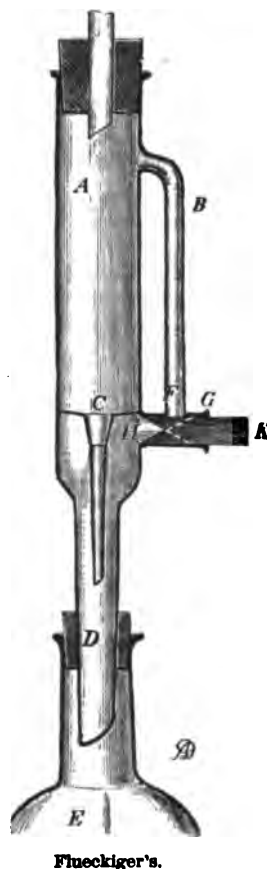
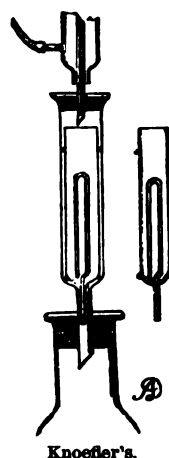
3. The receiver, C, in which the two little flasks stand. Concentric with the upper end of this receiver runs a glass groove or channel, R, into which the head-piece, D, fits. A perfect joint is secured by pouring mercury into the groove.

4. The head-piece, D, in which the digester is fixed. It ends above in the long tube, T, the condensing tube for the vapor of the solvent. At two-thirds of the height of the head-piece, on its inside, three little knobs, P, are attached, upon which rests the rim of the digester.

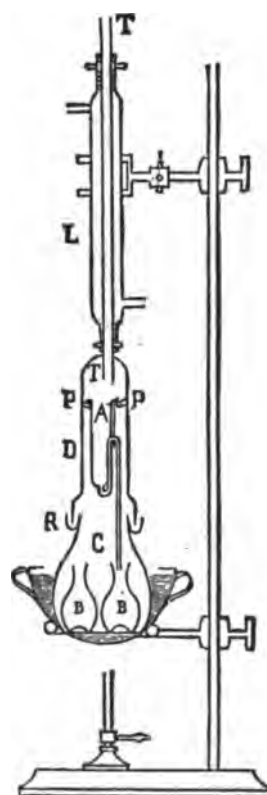
5. The glass tube, T, is fused into the head-piece. It runs through the condenser, L.

The mode of using the apparatus is as follows:

All parts of it being perfectly clean and dry, the two little flasks, one carefully tared and the other containing the ether or other solvent, are put into the receiver. The substance to be extracted, also weighed, is placed inside a filter into the digester which is suspended on the knobs, P, inside the head-piece. The latter is then adapted to the receiver and mercury poured into the gutter, R. The digester must be so placed that its lower outlet is exactly over the empty tared flask.



Flueckiger's.



Petermann's.

Heat being supplied by means of a water-bath, the ether in the other flask will boil, and when condensed pass through the substance and arrive in the tared flask, charged with fat, etc. When the extraction is completed, the water-bath is somewhat lowered (to diminish the heat), the receiver rotated so as to bring the outlet of the digester over the empty flask, and the ether then collected in the latter. The extracted fat will alone remain in the tared flask. The latter is now allowed to dry, cooled, and weighed. —*Journ. Am. Chem. Soc.*, x., 162.

[Note by Ed. Am. Drugg. — We have described the last-named apparatus (at least what is practically the same) in our last volume (page 27). It is there credited to J. Graftian.]

Distinction of Resorcin from Carbohc Acid and from Salicylic Acid.

A SOLUTION of resorcin, or resorcinol, either in water or in alcohol, gives a violet coloration on addition of a drop of sodium hypochlorite, which soon turns yellow, and which, on warming or on further addition of hypochlorite, becomes dark yellow, red, or dark brown. One part of resorcinol in 10,000 parts of water can be detected by the violet coloration. Carbohc acid, salicylic acid, benzoic acid, and allied bodies do not give the violet coloration, the solution either remaining colorless or showing a slight fluorescence; on warming it turns slightly yellow. A solution of resorcinol, treated with a few drops of ammonia and then with a few drops of sodium hypochlorite, gives a red-violet coloration which turns yellow on standing and dark green on boiling. Salicylic acid, benzoic acid, and antifebrin give no coloration with this reagent; phenol gives a blue-green coloration.—H. BODDÉ in *Nederl. Tijds. v. Pharm.*

Fresh Discoveries of Ozokerite.

THE present ceresin industry is, in its relations to ozokerite (earth wax), chiefly confined to Galicia, which explains why fresh sources are so assiduously sought for. Ozokerite has given rise to many fanciful reports from North America alleging its discovery in great beds of the white variety. Ceresin is said also to have been discovered in districts covering many miles in extent, but most of these statements require a confirmation which they have not yet received. The firm of Messrs. Lach, Morpurgo & Benesch, of Frenso, have now at considerable expense succeeded in obtaining samples of ozokerite from America, and also from the Caucasus. The product from the Caucasus appears to be of a kind very inferior to that obtained in Galicia. Analyzed according to the method recently described in the *Chemical News*, it gave the following results:

Melting point of the raw wax, 68° C.

After treatment with 20 per cent fuming acid the ceresin obtained was of second quality, and gave: melting point, 68.5° C. Total amount obtained, 58.1 per cent. Volatile portion, 1.8 per cent.

The raw Caucasian ozokerite has a very disagreeable smell; it can be worked up in quantity only with great difficulty, becomes stiff in the pan, and presses very badly.

The price of ceresin derived from this source is at present too high to cause very severe competition with the products of Galician ozokerite, but many think they have reason to believe that it will prove an important rival at a time not far distant, especially when the means of transport are improved.

A sample of ozokerite from the State of Colorado, North America, was obtained by Messrs. Lach & Co. The substance appears to exist in very rich deposits, and of a particularly fine quality, and the profit depends only on the difficulties of transport.

The most thorough research, however, shows that Colorado ozokerite is quite useless for the manufacture of ceresin. The substance is cut out in cakes of dimensions 36 x 20 x 6 Cm.; it is very black; has a disagreeable catechu-like smell; is extremely brittle, and can be easily pulverized. Here and there in the mass are brown fatty streaks. It is easily soluble in benzin, depositing the extremely small proportion of only 0.02 per cent of sand. It is quite insoluble in alcohol and in water. On melting this substance a kind of froth is formed at a temperature of only 95° C., and this froth, even with the greatest care, runs over into the neck of the retort, or over the sides of the melting pot. This is probably due to a small proportion of water, which one would scarcely expect to be present in such compact masses of material. Experiment showed the following results:

Melting point of the raw substance, 76° C.; melting point of the raw substance when deprived of water, 76.5° C.

When treated with 20 per cent of sulphuric acid no ceresin is obtained. Even at a temperature beyond 300° C. the hot liquid does not pass through filter paper, although it is quite mobile. When subjected to distillation the result was as follows:

	Per cent.
Paraffin and Oils.....	90.00
Loss by escape of Gases.....	2.12
Loss by escape of Water.....	2.60
Residue after Distillation.....	5.28
	100.00

The distillation products could be measured only up to 360° C., when scarcely 3 per cent of oils solidifying at 30° C. came over.

At much higher temperatures the distillation took place more quickly and safely and gave a very good raw product, from which an excellent paraffin could be made.

This ozokerite from Colorado is then only suitable for the manufacture of paraffin oil, and is quite useless for the ceresin industry.

The price is at present disproportionately high.—DR. B. LACH in *Oil and Colorman's Journal*.

Medical and Chemical Misconceptions about Lithia.

AT the last British Pharmaceutical Conference, Mr. Louis Siebold read a paper on this subject, from which we take the following (after *Pharm. Journ.*):

For many years it has been an established article of faith with the medical profession to regard lithium compounds as powerful agents for preventing the deposition of uric acid in the tissues, or for dissolving and removing such deposits when already formed. These salts have been generally credited with being greatly superior for these purposes to the corresponding potassium salts; and they therefore enjoy a correspondingly greater reputation as remedies in chronic gout, calculus, etc. They owe their place in *materia medica* originally to the observation that, as compared with potash or soda, a smaller amount of lithia suffices to form a soluble salt with uric acid, and that this salt is more readily soluble in water than the corresponding potassium and sodium salts. From a chemical point of view, the relatively greater power of lithia to dissolve uric acid, or—what practically comes to the same thing—its greater antacid or neutralizing power, presents itself as a matter of course, owing to the low atomic weight of lithium. It follows from the atomic weights of lithium and potassium that lithium carbonate will go nearly twice as far in this respect as potassium carbonate, or, to put it more exactly, that 74 parts of the former salt possess the same acid-saturating power, and are likely to dissolve as much uric acid as 138 parts of potassium carbonate. This is a natural conclusion apparent to every chemist; and if the medicinal fame of lithium salts went no further than appears warranted by this conclusion, I should not now trouble you with any observations on this subject. But that fame extends further, and the faith that many medical practitioners, and chemists along with them, have in the superior virtue of lithia amounts to a belief that its superiority is far greater than is indicated by the ratio of molecular weights. Were this not so, it could have hardly come to pass that so much preference is given to the not so harmless and much more expensive lithium preparations. Nor is this faith in the superior efficacy of the latter confined to the carbonate, which is a direct antacid, and to the citrate, which, though a neutral salt, becomes converted into carbonate within the organism and thus acts as an indirect antacid. It is extended also to a number of mineral waters containing lithia, generally mere traces of it, notwithstanding the fact that what there is of lithium in these waters generally occurs in them as chloride or as sulphate, salts which neither directly nor indirectly act as alkalies and possess no solvent action on uric acid. This seems quite irrational, and the question arises whether this fame, so far as it exceeds the reasonable chemical conclusions alluded to, really rests on a solid foundation, or whether it has no such foundations but is based on misconceptions. Experiments which I conducted a few years ago, and which were then left unfinished, strongly inclined me to the latter view; and a further investigation of this subject, carried out quite recently, confirms me in this opinion. It is not my intention to trouble this meeting with a description of the numerous experiments made, though I shall be glad to give any information I may be asked for in the discussion. I shall simply give, in the briefest form, the conclusions I have arrived at from these experiments. They are as follows:

1. The relative solvent action of solutions of lithium, sodium, and potassium carbonates on a given weight of uric acid, under equal conditions of dilution and temperature, is strictly proportional to the ratio of the molecular weights of these solvents. (The determinations were made at 37° C., and the proportion of water to uric acid was not much greater than that occurring in urine.)

2. Equivalent proportions of the three solvents named dissolve equal quantities of uric acid under equal conditions of dilution and temperature (experiments conducted on the same lines as in 1).

3. Crystals of uric acid deposited from urine show the same behavior towards the solvents named as the pure uric acid used in 1 and 2.

4. Equal weights of a urinary sediment consisting of acid urates are dissolved by quantities of the three solvents named proportional to their molecular weights.

5. Lithium chloride and lithium sulphate exercise no solvent action on uric acid and acid urates.

6. Natural mineral waters containing lithium chloride have no solvent action on uric acid beyond that exercised by basic constituents simultaneously present, and by the water.

7. The degree of alkalinity of urine produced by the internal administration of medicinal doses of lithium citrate is not greater than that produced by equivalent doses of potassium citrate. It is greater than that produced by equal doses of the corresponding potassium salts, but only so in proportion to the molecular weights. (All these experiments were conducted under strictly equal conditions of diet. The alkalinity was determined in the urine of twenty-four hours.)

To the foregoing conclusions I may add that lithium salts are known to be more toxic than potassium salts, and hence less suitable for prolonged administration. Altogether, the superiority of lithium salts as remedies in calculus, gout, etc., appears to me much overrated.

Saccharin Injurious to Digestion.

SACCHARIN is not capable of being digested, but passes unchanged through the organism. In experiments made by Stiff with himself, in which 3 Gm. of saccharin a day were taken, a slight purgative action was observed and afterwards a loss of appetite. To ascertain the action, if any, of saccharin on digestive ferments, experiments were made with meat, egg albumen, casein, and pea-meal, with and without the addition of saccharin. The presence of saccharin delayed the solution of the albuminoids, which was not complete after twelve hours' contact with the gastric juice. The greater the amount of saccharin present, the more marked was its action. Similar results were obtained with the pancreatic ferment and with diastase. As the whole process of digestion is a series of fermentations, saccharin must be considered as a substance which interferes with digestion, and therefore injurious to health.—*Bied. Centralbl.* and *J. Chem. Soc.*

Solubility of Glass Bottles.

FOLLOWING a paper on this subject read by Mr. R. Reynolds before the British Pharmaceutical Conference, Dr. Thresh said he had noticed a similar action some years ago, when he was investigating the action of rain in certain districts on vegetation. It was supposed that some lime kilns which had been recently erected materially affected vegetation, and he had collected the rainfall at many different points. When he collected the rain on litmus and other papers, he almost invariably found that it had an acid reaction; but, strange to say, when collected in bottles, it was either neutral or distinctly alkaline. On investigating the cause of this, he discovered that in all the bottles he employed—he tried all kinds and found the results the same—some decomposition took place in a very short time, and the free acid disappeared. His impression was that it was a decomposition of silicate of soda or of lime, in which the acid combined with the base, and the silica was thrown down. That this was the case was the more probable, because in evaporating samples of rain water he found that when collected in platinum dishes the solid residue per gallon was 1 to 4 grains less than when collected in glass, and this residue was chiefly silica. He also noticed, in making further experiments, that in titrating an acid solution, if the acid were run in until a faint tint was produced with litmus, and then the liquid were boiled for a few minutes in a glass vessel, the color would disappear. Upon adding acid, the color would again be obtained, which would again disappear on boiling, and so on; and he had seen students in the examination room go on repeating that process for an hour, thinking they were increasing the accuracy of the result, evidently not having observed that this naturally occurred when these solutions were boiled in glass flasks. Another thing still more interesting was this: if in one of these bottles (and they varied considerably, though they were all acted upon) a mixture practically neutral and containing tincture of cardamoms were placed and kept in it for some time, it would vary considerably in color in the course of, say, a month, and it was quite possible that the complaints sometimes made as to the color of such a mixture were due to this cause.

Method for the Quantitative Estimation of Fat in Milk.

T. DIETRICH uses the following method for the determination of fat in milk when many samples have to be treated at the same time:

A strip of filter paper about 27 Cm. long and 8 Cm. broad is tightly wound round a solid wooden cylinder 28 Mm. in diameter, thus making a paper shell closed at the bottom and some 5-6 Cm. high, like that used by Soxhlet for the determination of fat in feeding-stuffs. A similar shell of cotton wool is now made by winding a strip of prepared cotton wool (such as is used for surgical bandages), of the same dimensions, round a wooden cylinder 20 Mm. in diameter. This is rammed into the paper shell, thus lining it with a layer of cotton wool 4-5 Mm. thick; the hole in the centre is then loosely filled with cotton wool.

From 15-20 Gm. of the milk—which, if sour, is first shaken with a few drops of strong ammonia, to make the liquid homogeneous—are poured into a weighing bottle, weighed, and then poured into the prepared shell, the bottle being weighed again. The shell is then placed upon a small glass dish and dried at 60°-80°. If the shell has been carefully made no milk will pass through on to the dish. When total solids are to be determined, the shell is dried till of constant weight; otherwise it is transferred directly to the Soxhlet extractor.

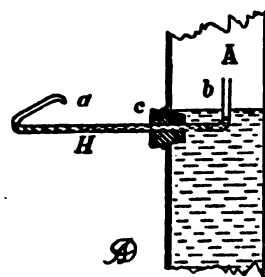
The author finds that his shells, which, on an average, consist of 1.5 Gm. of paper and 2 to 2.2 Gm. of cotton wool, contain nearly 0.01 Gm. of fat, which must be allowed for in accurate analysis.

The Soxhlet extraction tubes are ground into the condensers, and also into the weighed ether flasks, three of which are applied to each extractor, thus preventing loss of time in putting the apparatus together.—*Zeitsch. f. ang. Chem.* and *J. Soc. Chem. Ind.*, 1889, 823.

SIPHON FOR TAKING SAMPLES OF DISTILLATES.

J. HERTKORN has devised a very simple and generally useful siphon for the purpose of withdrawing samples of a distillate from an apparatus closed during the operation.

A represents a receptacle or part of a receiver in which the distillate collects and rises to a short distance over

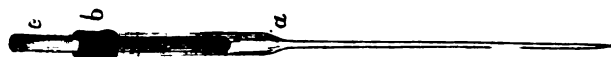


the orifice protected by a stopper, which latter bears the siphon. The inner leg of the latter is of such a length that when it is turned straight upward its outlet is above the level of the liquid. To start the siphon, it is only necessary to turn it half-way round by twisting the outer leg.—*After Chem. Zeit.*

A SIMPLE PIPETTE.

A CORRESPONDENT of the *Pharmaceutische Zeitung* some time ago recommended the pipette here illustrated. It is not entirely new, but deserves mention here.

The pipette proper is a strong glass tube drawn out to a point. Upon its wider orifice a piece of stout but soft



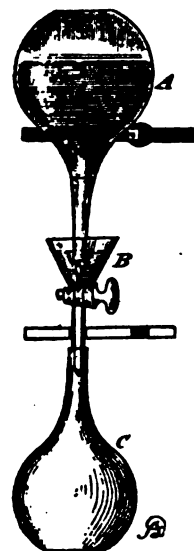
tubing is attached, and through it is passed a strong-walled test tube of such diameter that it may easily be pushed up or down.

The correspondent adds that he believes this form of pipette to have first been recommended by Prof. Fittig, of Strassburg.

SEPARATION OF ETHEREAL FROM AQUEOUS SOLUTIONS.

IN the method of extracting dissolved substances by immiscible solvents, it becomes necessary, after thorough agitation, to allow the different layers to separate, and then to collect each by itself. Each chemist who has had to practise this method has probably worked out a way of his own, the mode of manipulation being no doubt very similar in most cases.

A. Gawalowski recommends the following practical plan for this purpose: Procure a few flasks with long-drawn-out neck. Into one of them place a stoppered funnel. Into the other introduce the liquid to be extracted, add the ether, etc., shake, allow to separate, then invert the flask with the finger over the opening, and adjust it in a stand so that, when the orifice is exposed, enough liquid (of course from the aqueous layer) will flow into the funnel to fill it about half-full. By carefully regulating the stop-cock, the liquid is gradually allowed to run off into the second flask, and more liquid will pass down from the inverted flask. Towards the end the latter ought to be set a little lower, so that when the last of the liquid runs out it may not overflow the funnel. [We would use a funnel large enough to prevent this.—*Ed. AM. DRUGG.*] If the liquid in C is to be extracted again, the two flasks are merely interchanged.—*Chem. Centralbl.*



Iodoform Test for Sweet Spirit of Nitre.

THE new Dutch Pharmacopœia, besides directing that sweet spirit of nitre shall be tested qualitatively with ferrous sulphate, prescribes the following quantitative test, in which the formation of iodoform is made a criterion:

Mix 5 C.c. of the spirit with 10 C.c. of water of ammonia, and add 2 C.c. of a solution prepared from iodine 1 part, potassium iodide 2 parts, and water 17 parts. After the black precipitate formed is dissolved, a further addition of 2 C.c. of the iodine solution should not, within half an hour, cause the separation of crystals of iodoform.

Adulterated Castor-Oil.

MICHAEL CONROY says that castor-oil has been received in London from Calcutta, bearing the usual marks, which has been found, on examination, to contain 20% to 30% of cocoanut-oil. The most reliable test he has found to be based upon an observation that under a certain temperature castor-oil will not dissolve its own volume of petroleum ether. He says further:

"The specific gravity of castor-oil at a temperature of 60° F. is 0.964. I have never found any higher, and the lowest I have met with was a sample of French oil which gave 0.9625 at the same temperature. There is a greater range than this given in text-books, but I much doubt their accuracy, and in my experience 0.963 to 0.964 is the correct density for genuine oil. When castor-oil is adulterated with 10% and over of cocoanut-oil, the latter separates when the temperature falls to 60° F., and it becomes necessary in such cases to take the density at a higher temperature. I have, therefore, taken a sample of castor-oil possessing 0.964 at 60° F., and found its density to be 0.949 at 100° F. A sample of cocoanut-oil the same temperature (100° F.) I found to be 0.912. . . . From this it will be seen that the difference between the two densities is sufficient to enable one to arrive at a very accurate estimation, by a very simple calculation, of the amount of cocoanut-oil present.

"In the first place, it is of course necessary to ascertain the presence of cocoanut-oil, and this can be done by heating the sample under examination in a small porcelain dish, when the distinctive odor of cocoanut-oil can readily be ascertained. By this plan the presence of even 1 per cent can be detected, and 5 per cent is quite distinctive to any one possessing an ordinary sense of smell.

"I have heard within the last few days that some castor-oil has reached Glasgow, which, on examination, was found to be adulterated with cotton-seed oil.

"The adulterant is probably what is known as 'blown' cotton-seed oil, which is made by blowing warm air through the oil. Great heat is thereby developed, and the oil increases in density and viscosity.

"The presence of this oil can be detected by my modification of the nitrate of silver test, which is applied as follows:

"1. Make a test solution containing 5 parts of silver nitrate and 1 part of nitric acid (specific gravity 1.42) in 100 parts of rectified spirit (specific gravity 0.838).

"2. Pour about 100 grains of the oil under examination into a dry test tube about half an inch in diameter, add to it 10 grain measures of the above test solution, and place the tube in boiling water for five minutes.

"Castor-oil assumes a pale yellow color, but the presence of cotton-seed oil causes it to become deep red.

"In conclusion, I would just add that the quantitative petroleum ether test is capable of much further development, but being tied for time I have not had an opportunity of fully working it out."—*Pharm. Journ.*

Oil of Cajuput.

From a paper by R. A. Cripps, recently read at the Midland Counties Chemists Association, we take the following (after *Pharm. Journ.*):

Some time ago my attention was drawn to a sample of Linimentum Crotonis [*Brit. Pharm.*: Croton Oil 1 fl. oz., Cajuput Oil 3½ fl. oz., Alcohol 3½ fl. oz.] which did not form a clear solution, but consisted of two layers, the upper and larger one being thin and limpid, the lower one oily. When warmed the liquid became homogeneous, but again separated into two layers on cooling. The cause was evidently not due to the croton oil, the same sample having on former occasions given a clear liniment; the spirit used was of B. P. strength; it was, therefore, clear that the cajuput oil was at fault. I therefore examined the oil and found its spec. grav. to be 0.913. This being so much below that of any sample I had previously examined, I concluded that the oil was either adulterated or that the distillers of cajuput oil are in the habit of collecting the distillate in fractions without subsequently mixing them, this being one of the earlier fractions. I have, therefore, examined a number of samples in the original bottles (old wine or spirit bottles) with the following results:

Average of ninety-five samples of cajuput oil, 0.9232.

Average of ninety-three samples of cajuput oil, excluding two low samples (viz., spec. grav. 0.913 and 0.8945), 0.9236.

The color of the samples varied from pale brownish-yellow to bluish-green, the color bearing no relation to the specific gravity. With the exception of the sample of spec. grav. 0.913 all these oils came in four separate consignments, the members of each consignment varying in specific gravity to the extent of from 3 to 7 in the third decimal place, not counting the last anomalous sample, although eighty-five out of the ninety-five samples ranged from 0.922 to 0.925. I think, therefore, we may consider it proved that the mixing of various fractions or batches of oil is performed very imperfectly or not at all. The anomalous sample (spec. grav. 0.8945) possessed a slightly peculiar odor, was of a pale bluish-green color, and failed to make a satisfactory croton liniment. I have not yet been able

to further examine this oil, but intend submitting it to fractional distillation at an early date.

I may mention that it is important that the specific gravity of cajuput oil be taken at exactly 15.5° C., in consequence of the high expansion equivalent of the oil (which I have found to be .0009 for each degree Centigrade between 13° C. and 23° C., unless this equivalent be borne in mind.)

In consequence of these results, together with the specific gravity given by Mr. West (*Pharm. Journ.*, xix., page 235), I should suggest that the Pharmacopœia contain among the tests of cajuput oil "spec. grav. from 0.922 to 0.926 at 15.5° C."

On Sodium Carbonate and its Decomposition by Heat.

FRESENIUS and other analytical authorities teach that, when sodium carbonate is moderately ignited and has lost all excess of water, etc., it undergoes scarcely any further loss; but that it loses materially if it is heated—even moderately—to incipient fusion.

Dr. Richard Kiessling has studied this subject more in detail, since the use of sodium carbonate as one of the fundamental chemicals in preparing volumetric solutions would become objectionable if its absolute stability were shown to be fallacious.

In making his experiments, he started from a bicarbonate which had the following composition:

Sodium Carbonate.....	64.4 per cent.
Water.....	11.6 "
Excess of CO ₂	24.0 "

A pure sodium bicarbonate of the formula NaHCO₃ has the following composition:

Sodium Carbonate.....	63.114 per cent.
Water.....	10.711 "
Extra CO ₂	26.175 "

Of the former a quantity of 6.170 Gm. was subjected, on a watch glass, in a drying oven, to a gradually increasing temperature. At 60° C. there was no loss; at 70° C. the loss was very trifling; at 90° C. it had become quite material, and all of the extra carbonic acid was dissipated by heating to 125° C. The residue weighed 3.983 Gm., or 64.54%. This consisted of sodium carbonate, absolutely free from caustic soda. It was now heated to 200° C., which caused no further loss. On raising the temperature to 400° C., however, a loss of 0.02 Gm. (0.33%) was incurred, and the residue gave a decided reaction of caustic alkali.

On repeating the experiments in a platinum crucible, which permitted the employment of higher temperatures, the above results were confirmed. By increasing the heat to incipient melting, the residue gave a strong reaction of caustic soda.

It follows from these experiments that a perfectly homogeneous and standard sodium carbonate may be obtained by exposing the pure bicarbonate to a temperature of 150° C. until it no longer loses weight.

The author suggests to control the purity of the sodium carbonate by using potassium tetroxalate (KHC₄O₆. H₂C₄O₆.2H₂O) as a control-basis for volumetric purposes.—After *Zeitsch. f. angew. Chem.*, 1889, 332.

Coloring Matter for Vermin Poisons.

At the late British Pharmaceutical Conference Prof. A. H. Allen read a paper on "Vermin-Killers containing Strychnine," in the course of which the question of coloring these agents, for the purpose of attracting attention to their dangerous character, came under consideration. The following are Prof. Allen's recommendations:

On the whole, perhaps the most suitable pigment for coloring vermin-killers would be chrome-green (oxide of chromium). In it we have a bright green pigment of high coloring power, quite insoluble in water and in dilute acid and alkaline liquids. It is wholly permanent under all imaginable conditions, and is not affected by ignition. Chromium is not a natural constituent of the body, is not used internally as medicine, and is not liable to be present accidentally, even in traces, in any beverage or article of food. It can be detected and determined with ease and certainty even when present in very minute quantity. Owing to its insolubility, oxide of chromium would remain wholly unabsorbed if taken internally. Hence, if it were added to the preparations of strychnine, etc., in a definite and invariable proportion, an estimate of the minimum amount of the poison taken by a deceased person could be arrived at by determining the quantity of chromium contained in the alimentary canal, even though the poison itself had been wholly absorbed or decomposed; and this could be effected with equal ease and certainty after prolonged inhumation, or even after cremation of the body.

The discussion of the best pigment for coloring vermin-killers has not merely an academic interest, for the present facilities for obtaining and misusing poisons have recently attracted much attention, and it is not improbable that at the next session further legislation may be attempted with reference to the sale of poisons. Every pharmacist is aware that there are special restrictions with regard to arsenic, which cannot legally be sold in quantities of less than

10 pounds, unless colored with soot or indigo. This provision is good in theory, but badly devised. It prevents the sale of an ounce of unmixed white arsenic to a professional chemist like myself, for strictly proper purposes, but it does not prevent a would-be murderer from obtaining a large quantity of the poison, provided he can give some plausible excuse for requiring it. It is interesting to note that all the solid arsenic found in the house of the late Mr. Maybrick was mixed with charcoal (not with soot or indigo), while two bottles were also found containing some of the colored arsenic mixed with water. The discovery of a stained handkerchief in association with this colored arsenic suggests that an attempt was made to filter the solution from the charcoal, which proving unsuccessful, the experimenter had recourse to an infusion of arsenical fly-papers. As already pointed out, charcoal and soot are by no means suitable pigments for coloring poison, and indigo is not the best for the purpose. Pharmacists can do much to prevent accidental and intentional misuse of vermin-killers and such preparations if they will habitually add sufficient of a mineral pigment to color the powder a decided blue or green, and will take more care to record sales of vermin-killers in the poison book than is at present the practice in some districts. But it would be useless to enact that all preparations of arsenic, strychnine, and other deadly poisons sold as vermin-killers should be colored with a certain proportion of mineral pigment, if the sale of fly-papers containing a dangerous or fatal dose of arsenic or other poison is to be permitted with impunity. Clearly all such fly-papers should be impregnated with some soluble coloring matter which would color the water in which they were soaked. Sulphonated indigo ("indigo-carmin") would be a suitable coloring matter for the purpose, though the coal-tar dye known as safranin would present some advantages.

But organic coloring matters can be removed from solution by simply immersing silk, wool, or mordanted cotton in the liquid, and hence are less suitable for the purpose in question than certain inorganic coloring matters. Of these the soluble salts of chromium present several advantages. Thus, if in the form of double tartrate of chromium and potassium (or a mixture of chrome alum and Rochelle salt), the chromium is not detected in its solution by alkalis, acids, sulphuretted hydrogen, sulphide of ammonium, or phosphates or carbonates of the alkali metals, and cannot be withdrawn from solution by either animal or vegetable fibres. On the other hand, the chromium will not interfere with the detection and determination of arsenic, strychnine, and other poisons, and can be itself determined with ease and accuracy after evaporating the liquid to dryness and igniting the residue. —*Pharm. Journ.*, No. 1007.

Lime Water.

In a paper read by T. A. Ellwood before the Chemists' Assistants' Association, the author said that the quality of lime water depends upon the purity of the lime used, the method of slaking it, and the amount of water used; the time allowed to stand before decantation from the insoluble portion, the method of keeping, and the bottle it is kept in.

The solubility of lime considerably decreases with rise of temperature; at boiling point scarcely half the amount is dissolved as at ordinary temperatures; why this should be the case has not yet been ascertained. It was suspected by Messrs. Shenstone and Cundall that this was due either to impurities or to the action of the lime upon the vessels used, which are usually of glass; they therefore tried an experiment, using a platinum tube instead of glass, and a very carefully prepared pure sample of calcium hydroxide. They came to the conclusion that their suspicion was wrong, and that no doubt remains on the point: calcium hydroxide is very decidedly less soluble in hot water than in cold; they were, however, unable to assign a reason for its diminished solubility.

The slaking of lime has a considerable influence upon its solubility in water; if carelessly done the result will in all probability be to make a lime water under strength. If, however, the B. P. method is adopted, and the lime is good, not overburnt, there need be no fear of obtaining anything but a satisfactory solution; rather less water than is ordered by the Pharmacopœia to slake the lime is preferable.

Messrs. Nesbit and Maben have said they do not consider it necessary to have freshly slaked lime, providing the ordinary is well kept. My results lead me to conclude that freshly slaked lime is better, but that a solution of correct strength can be obtained from a carefully preserved sample if it does not contain carbonate and is less than a month old; beyond that age I find, even if it contains no carbonate, its solubility decreases.

Some chemists prefer making their lime water direct from the lime (calcium oxide) itself, by simply pouring water upon it direct and then bottling. There are several objections to this method. The lime is almost sure to contain some other soluble impurities, such as chlorides or sulphates, which in the case of calcium hydroxide are ordered to be washed away before making the lime water. Such samples would therefore contain an excess of calcium, but not all of it in the required form. . . . By

adding lime to water, small quantities at a time, and keeping a low temperature, a supersaturated solution may be made containing 20 grains to the pint, which is double the official strength.

It is a common custom, in making lime water, to simply add an indefinite amount of slaked lime to a bottle containing ordinary water, and then standing on one side until required for use, which perhaps may not be for several weeks. Such a method is very erroneous. First, ascertain whether the lime is free from chlorides by washing and testing washings with argentic nitrate; remembering also that the Pharmacopœia directs that slaked lime should be recently prepared. Second, add the slaked lime to distilled water in definite proportions (1 to 100), and shake thoroughly for two or three minutes. Third, adhere to directions, and decant or siphon off after twenty-four hours; for the solution, rather than improving, will deteriorate by keeping.

Lime water should not be kept, as is very frequently the case, in the ordinary stoppered white rounds of the shop, as, with the other alkalis, it possesses a considerable solvent power for lead. It must be in bottles free from lead and in a cool place, and when, owing to absorption of carbonic acid, it is observed to deposit on the sides, it should be tested and only used providing it is equal to the required standard. —*Pharm. Jour.*, November 23d, 1889.

[ORIGINAL ABSTRACT.]

Vinyl Alcohol as a Constant Concomitant of Ethylic Ether.

TH. POLEK and K. THUEMME recently observed a peculiar behavior of ether when used as a solvent for mercuric chloride. The authors desired to separate the latter from a solution of monochloride of mercury in pure sodium or potassium carbonate, by shaking with ether. This was found to render the liquid gradually turbid and to cause the separation of an amorphous, white precipitate. By repeated shaking with ether, the whole of the mercury present in the mixture could gradually be transferred to the precipitate in the same white, amorphous condition. On further examination it was found that, no matter how pure the alcohol and sulphuric acid were from which the ether had been prepared, the same precipitate was produced. Hence the substance, whatever it was, which caused the precipitate, had to be regarded, not as an accidental impurity, but as a constant concomitant of the ether.

The authors, having assured themselves of the fact that not a trace of aldehyde was contained in the ether, gradually found that the contaminating substance could be withdrawn from the ether by any of the following methods:

1. By shaking it with a clear mixture of 4½ volumes of a saturated solution of potassium bicarbonate and 1 vol. of mercuric chloride in water.
2. By treating the ether with caustic potassa (solid) or solution of potassa.
3. By repeated shaking with water.
4. By treatment with bromine.
5. By distilling the ether in the presence of phenylhydrazin, which causes a crystallizable residue to remain behind.

The white precipitate caused by shaking the contaminated ether with the mercury solution (quoted under No. 1 above) was first studied by the authors. We shall only quote a few of its peculiarities. On boiling it for some time with solution of potassa, a more or less black-looking or dark-green precipitate is formed which is absolutely insoluble in solution of potassa. Of the white substance originally employed, about 67 per cent is converted into this black powder. This is a dangerous substance. One of the authors heated 0.1 Gm. (only 1½ grains) of it in a dry tube, in order to study its behavior when heated. After it had been slowly heated in a paraffin bath to 157° C. (315° F.), it exploded with extreme violence and with a noise like that from a cannon. The whole of the apparatus was shattered and the pieces flung in all directions. Explosion of the substance could not be produced by a blow.

A careful ultimate analysis of the white substance thrown down in the mercury solution showed it to have the composition $\text{Hg}_2\text{Cl}_2\text{O}_2\text{C}_2\text{H}_4$, which doubtless contains the vinyl group, and may be designated as vinyl oxychloride of mercury.

The black, explosive substance was found to correspond to the composition $\text{Hg}_2\text{C}_2\text{H}_2\text{O}_4$, and was shown to contain acetylene, which accounts for its explosive properties.

It was stated above that, by boiling with solution of potassa, the original white precipitate produced about 67 per cent of the black precipitate. If the alkaline solution is decanted from this and supersaturated with nitric acid, a voluminous white precipitate separates, which the authors found to be acetylene-oxychloride of mercury.

The authors established the identity of the substance present in the original ether as a vinyl compound (and more especially as vinyl alcohol) by distilling it with phenylhydrazin, which enters into a crystalline combination with vinyl. They proceeded in the following manner:

Five kilos of the contaminated ether were distilled with 7 to 9 Gm. of phenylhydrazin. The distillate was found to be deprived of the contaminating substance, inasmuch as it no longer imparted a brown color to potassa, and no longer gave the first-described white precipitate with the mercury solution. The compound which the vinyl alcohol forms with the phenylhydrazin is vinylphenylhydrazid: $C_6H_5HN.NHC_2H_5$.

A specially interesting portion of the authors' paper is that in which they discuss the cause of formation of the vinyl alcohol in ether, either during the process of manufacture, or on keeping.

It was found that when ozonized air was passed for some time through perfectly pure ether, or after the latter has been shaken for a considerable time with a solution of peroxide of hydrogen, some vinyl alcohol is produced. Even contact with atmospheric oxygen alone will produce it, and at the same time some peroxide of hydrogen.

In one experiment, an absolutely pure ether (spec. grav. 0.721; boil. point $34^{\circ}C.$) was used, which had been repeatedly rectified over phenylhydrazin, gave not a trace of precipitate with the mercury solution, was perfectly neutral, and did not alter iodide of potassium. It was then exposed, in a partly-filled bottle, for two months to direct sunlight. At the end of this period it was found to produce a copious precipitate with the mercury solution, to set iodine free from iodide of potassium, and to comply with other tests showing the presence of peroxide of hydrogen alongside of vinyl alcohol.

The appearance of these two compounds in ether which had been absolutely freed from them is manifestly due to a process of oxidation. The authors conclude (from considerations of analogy which we omit) that with the progress of oxidation the quantity of peroxide of hydrogen constantly diminishes, and more vinyl alcohol is produced, as the latter is much more stable in ethereal solution. By further contact with atmospheric air, the vinyl alcohol is gradually converted into acetic acid without intermediate formation of peroxide of hydrogen.

The question still arises, How is the formation of vinyl alcohol during the process of manufacture of the ether to be explained? The authors have found it present in every single fraction of crude ether which they collected as distillate. They offer a suggestion that there may be some peroxide of hydrogen produced during the process, but have not been able to solve the problem so far.

The authors' paper contains many other interesting details which are here omitted.—After *Ber. d. Deutsch. Chem. Ges.*, 1889, 2863.

[*Note by Ed. Amer. Drugg.*—We have tested a number of specimens of commercial "Washed Ether," in accordance with the authors' new process, and have, in the case of washed ether, found evidence of a considerable proportion of the impurity. We must state, however, that no sign of it made its appearance immediately, but only after standing for some time (five minutes was the least time required), after being thoroughly shaken. On allowing the mixture to stand, not only was there a copious, granular, white precipitate, but the ether layer itself contained a small quantity of dark-colored floating films. The "mercury solution" prepared in accordance with the authors' directions, and filtered, had remained perfectly clear during the same time. It will be well to examine into this reaction more thoroughly, in order to ascertain whether ether for anæsthetic purposes should be required to produce no precipitate when shaken and allowed to stand for a definite time with the mercury solution.]

Assay of Tinctures of Belladonna and Aconite.

In a paper by R. Wright on "The Relative Value of Chloroform and Alcohol, and Mixtures of the Two, for the Extraction of Aconite and Belladonna Roots" (*Pharm. Journ.*), the author details his method for assaying the two tinctures, and finally states that the best menstruum for exhausting these drugs is a mixture of chloroform and alcohol.

The following processes were employed for estimating the alkaloidal strength of the tinctures:

Belladonna.—The simplest and most reliable process for the estimation of the belladonna alkaloids was found to be that proposed by Dunstan and Short, *Pharm. Journ.*, vol. xiv., page 625. Twenty C.c. of the tincture to be estimated were shaken up with two successive portions of 10 C.c. distilled water, by which means the alkaloids are withdrawn from solution in the chloroform-alcohol mixture with the alcohol, the chloroform retaining the coloring matter. The latter is drawn off, the alkaloidal solution rendered alkaline with ammonia, and the alkaloids removed by agitation with two successive portions of 10 C.c. chloroform. The mixed chloroformic solutions are afterwards evaporated in a clean tared platinum dish over a water-bath until the weight is constant.

Aconite.—It was first attempted to apply the process employed for the belladonna tinctures to the estimation of those of aconite. It was found, however, that the chloroform not only retained the coloring matter, but also some of the alkaloid, and therefore the following process was adopted:

Twenty C.c. of the tincture were introduced into a porce-

lain dish with 1 C.c. dilute sulphuric acid (B. P. strength) and 9 C.c. distilled water, and the mixture evaporated over a water-bath until the chloroform and alcohol had been driven off. The residual solution was filtered when cold, the filter being washed with another 10 C.c. of distilled water. The mixed filtrates were rendered alkaline with ammonia, and the alkaloids extracted by agitation with two successive portions of 10 C.c. chloroform. The mixed chloroformic solutions were then evaporated over a water-bath in a tared platinum dish until the weight of the residue was constant.

The following tables represent the results obtained. In each case two estimations were made, the mean of the two being taken as correct.

The important conclusions to be drawn from the results recorded in the tables are:

1. That chloroform, *per se*, does not nearly exhaust aconite and belladonna roots of their alkaloids.

2. That a mixture of chloroform and alcohol is superior to alcohol alone as a menstruum for their extraction.

It will be seen from the following tables that the best menstruum for exhausting belladonna root is a mixture of

Alcohol 4 vols., chloroform 1 vol.,

and for exhausting aconite root a mixture of

Alcohol 3 vols., chloroform 1 vol.

TABLE I.—Representing Alkaloids obtained from the Belladonna Tinctures.

Menstruum employed.	Quantity taken.	ALKALOIDAL RESIDUE IN GRAMMES.	
		Series I.	Series II.
Alcohol, 84 per cent.	20 C.c.	.006	.080
Alcohol, 4 vols.	20 C.c.	.008	.040
Chloroform, 1 vol.	20 C.c.	.006	.035
Alcohol, 3 vols.	20 C.c.	.007	.035
Chloroform, 1 vol.	20 C.c.	.007	.035
Alcohol, { equal	20 C.c.	.007	.033
(chloroform, } vols.			
Alcohol, 1 vol.	20 C.c.	.007	.033
Chloroform, 3 vols.	20 C.c.	.006	.011
Chloroform.....	20 C.c.		

TABLE II.—Showing Alkaloidal Residues yielded by Aconite Tinctures.

Menstruum employed.	Quantity taken.	ALKALOIDAL RESIDUE IN GRAMMES.	
		Series I.	Series II.
Alcohol, 84 per cent.	20 C.c.	.009	.066
Alcohol, 4 vols.	20 C.c.	.009	.074
Chloroform, 1 vol.	20 C.c.	.009	.076
Alcohol, 3 vols.	20 C.c.	.009	.068
Chloroform, 1 vol.	20 C.c.	.009	.068
Alcohol, { equal	20 C.c.	.009	.068
(chloroform, } vols.			
Alcohol, 1 vol.	20 C.c.	.006	.034
Chloroform, 3 vols.	20 C.c.		

Tests for the Identity of some Tinctures.

L. VON HALLIE publishes, in the *Apotheker Zeitung*, an interesting communication on the tests for the identity of some tinctures. The tests usually given for tinctures by the pharmacopœias of the different countries are confined to their physical properties, such as color, odor, and taste, while for many purposes it may be desirable to possess chemical tests as well.

Von Hallie, therefore, tried to find out characteristic chemical reactions for each of the different tinctures. He gives the following list:

Tinctura absinthii.—The preparing of pure absinthin is very difficult. The reactions of this substance can therefore not be made use of for determining the identity of the tincture. Five C.c. of the tincture evaporated and mixed with some sulphuric acid give a brown color, which is changed to violet on moderate heating. On adding a few drops of water and separating the precipitate by filtration, a beautiful red fluid with brown fluorescence is obtained.

Tinctura aloes.—Ether shaken with this tincture and afterwards treated with caustic ammonia will show a red-dish-violet coloration.

Tinctura calumbæ.—The yellowish-green residue, after evaporation of the tincture, is dissolved in dilute hydrochloric acid. A few drops of bromine or chlorine water added to this solution produce a pink color on heating of the mixture.

Tinctura cinchonæ.—Thirty minims of the tincture are mixed with liq. plumbi subacet., filtered and evaporated. The residue is dissolved in water, a few drops of sulphuric acid are added, and the whole is filtered. The solution should give the thalleoquin reaction with bromine water and ammonia.

Tinctura colchici.—Forty-five minims of the tincture are evaporated; the residue is dissolved in water, filtered, and the filtrate shaken with chloroform; the latter is removed by evaporation. The residue on addition of nitric acid becomes first violet, then brown, and, if some KOH is added, orange colored.

Tinctura colocynthis.—Thirty minims of the tincture are evaporated; the residue is taken up by 2 C.c. water and filtered through a moist filter. The filtrate is evaporated, when the residue will show a deep red color on addition of concentrated sulphuric acid, which color will change into a lighter cherry red on addition of molybdate of ammonia.

Tinctura digitalis.—Seventy-five minims of the tincture are evaporated; the residue is dissolved in 2 C.c. of water, precipitated with liq. plumbi acet. and filtered, agitated with chloroform, and evaporated. The residue shows a violet reaction on the addition of sulphuric acid and bromine water.

Tinctura gelsemii.—Fifteen minims of the tincture are evaporated to dryness; the residue is filtered together with 15 minims of acidulated water, then mixed with a little liq. ammoniæ, and agitated with chloroform. After evaporation of the chloroform gelsemine remains, which, with sulphuric acid and bichromate of potassium, gives a reddish-violet color. The liquid, after having been agitated, may be diluted with water, when it will show blue fluorescence.

Tinctura guaiaci gives a blue color with oxidizing agents. Sulphate of copper and bitter-almond water produce the same color.

Tinctura ipecacuanhæ.—The residue after evaporation is dissolved in a small quantity of acidulated water, the solution filtered, made alkaline with KOH, and agitated with ether. The residue after evaporation of the ether turns brown on addition of a concentrated solution of molybdate of ammonia in sulphuric acid; it turns into a lovely blue on the addition of one drop of hydrochloric acid added to the whole.

Tinctura jalapæ yields a residue after evaporation, which is turned red by addition of sulphuric acid.

Tinctura quebracho.—Seventy-five minims of the tincture are evaporated, and the residue taken up in acidulated water. The solution is then filtered, mixed with KOH, and agitated with chloroform. The chloroform is evaporated; the residue left becomes blue on addition of sulphuric acid and bichromate of potassium, and beautifully red on boiling with diluted sulphuric acid and chlorate of potash.

Tinctura nucis vomicæ.—After evaporation the residue is dissolved in water, the solution filtered, made alkaline, and agitated with chloroform. After evaporation of chloroform, the residue is colored red with nitric acid, violet with sulphuric acid and bichromate of potassium.

The Australian Wattle as a Source of Tannin.

THE growing scarcity of oak bark in the United States, and the substitution of all sorts of chemical agencies in the production of leather, lead up to the inquiry as to whether other vegetable products cannot be found to fill its place. Till within the last twelve years oak was indispensable in ship-building, but iron has been substituted almost entirely for it, more especially in vessels driven by steam. In the ordinary course of events this should have given some respite to the oak forests of the United States, but such is not the case. The growing demand for oaken furniture in the homes of the rich has so thinned out the timber that it is soon destined to become as costly as mahogany or black walnut. Hence all idea of cultivating oak for tanning purposes must be abandoned, as it is of too slow growth.

On a recent visit to Australia, where I spent over six months in the employ of the State Department, it was my good fortune to come across a vegetable product which will, in my belief, become a ready and perfect substitute for the rapidly vanishing oak of our own country. It is called there the "wattle," and belongs to the wide-spread family of acacias. These trees are cultivated extensively in the colonies of New South Wales and Victoria, where they lend a charm to the scenery, both by their fragrant blossoms and exquisite foliage. The two varieties most cultivated in those colonies are the black wattle and the broad-leaved wattle. Both these varieties are indigenous to an exceedingly dry climate and poor soil, and obtain their growth in about six years. I noticed they attained a greater diameter of trunk, and consequently a greater amount of bark, in the moister localities near the coast, but was told that the bark grown there contained a less percentage of tannic acid than that produced on the arid plains of Murray's River. On my return to the United States, in January last, I brought a small quantity of the reeds with me to give to friends in California, where they are already coming to a vigorous and healthy growth.

The black wattle (*Acacia decurrens*) produces the larger amount of tannic acid, and is, therefore, preferred by the trade in England, where its market value fluctuates from \$38 to \$42 per ton, according to the supply in the market. Its tanning properties may be readily inferred when I

state that hides can be readily tanned in a bath of liquor made from black wattle in forty-seven days, whereas in liquor made from the best Santa Cruz oak (the best found in all the Pacific States) the time required is from seventy-five to eighty days. The black wattle contains from 30 to 32 per cent of tannic acid, and a table of comparative percentages will show its industrial value:

	Per cent.
Black Wattle.....	30 to 32
Broad-leaved Wattle.....	26 to 28
Santa Cruz Oak.....	16 to 18
Siskey or Mountain Oak.....	14 to 16
Sacramento Valley Oak.....	10 to 12

This will be sufficient, I think, to convince the most sceptical of the real value of the Australian wattles and of the necessity for their immediate introduction into America, as well as their dissemination by the Agricultural Department of the National Government. Certainly, if the millions of dollars already invested in the tanneries of America are not to be impaired for the want of proper vegetable chemicals, some such step should be taken at once to relieve a growing stringency.

The broad-leaved wattle (*Acacia pycnanthea*), while it does not possess the tannic properties of the black wattle, has several advantages over it. It is a larger and handsomer tree, and, being a native of the mountain slopes of the picturesque Dandenong range, can withstand a greater degree of frosty weather than its congener. For this reason, while I am confident that the black wattle will thrive in the dry climate and arid soil of Arizona, Mexico, and Texas, as it is already doing in the southern counties of California, I am equally confident of the success of the broad-leaved wattles in the States of Louisiana, Georgia, Alabama, Mississippi, and Arkansas, especially if they are grown upon gravelly soil away from the swamps.—THOS. B. MERRY in *U. S. Consular Reports*.

[Note by *Ed. Am. Drugg.*—Of course, it is well known that the "tannic acid" existing in the bark and other parts of plants is different from the tannic acid used in medicine and in many of the arts. The latter is obtained from nutgalls, but cannot be used for tanning hides. There is no doubt, however, that the several kinds of tannin are closely related. It is evident that the change from the tannic acid contained in the oak to that contained in the nutgall growing upon the oak is brought about through a digestive process in the body of the gall insect (*Cynips gallæ tinctoriæ*).

Since several careful investigators are at present engaged upon a renewed and detailed study of various tannins and related bodies, it is to be hoped that more light will shortly be thrown upon the whole subject.]

Bismuth Hair Dye.

A CORRESPONDENT of the *Druggists' Bulletin* recommends the following as a reliable and harmless hair dye:

No. 1.

Bismuth Subnitrate.... 200 grains.
Water..... 3 oz.
Nitric Acid... 490 grains, or q. s.

Use heat to effect solution.

No. 2.

Tartaric Acid..... 150 grains.
Sodium Bicarbonate..... 168 "
Water..... 82 oz.

When effervescence of the latter has ceased, mix the cold liquids by pouring No. 1 into No. 2, with constant stirring. Allow the precipitate to subside, transfer it to a filter or a strainer, and wash with water until free from the sodium nitrate formed, as this salt would be an unnecessary impediment to the operation of the dye. Now allow the magma to drain until its weight is reduced to at least 4 oz. This can be readily determined without removing it from the filter and funnel, if both have been previously weighed. Transfer the magma, which consists of bismuth tartrate, to a dish, and dissolve it by the addition of sufficient liq. ammon. fort.

Next dissolve 100 grains of sodium hyposulphite in 3 oz. of water, and mix the two liquids. The total volume of the product should be about 7 or 8 oz., which would make the solution contain about 10 per cent of bismuth tartrate, the product from above quantities being nearly 300 grains. The addition of 1 oz. of glycerin is calculated to make it more effective in coloring the hair, as this ingredient prevents entire drying-up of the constituents, and thus favors a continuation of the decomposition.

Should it be desired to produce a jet black, this may be accomplished (after the dye given above has first been applied and allowed to dry) by the application of a solution of an alkaline sulphide or sulphuret. It is not necessary that the latter salt should be absolutely pure, as the commercial sulphuret of potassium answers well if fresh or undecomposed. The application of these dyes and mordants is usually made by means of a toothbrush and comb, so as to avoid staining the scalp.

Druggists and Doctors in the United States.

THE publishers of one of our leading business directories give the following number of retail druggists and physicians of which they have the addresses. While it is very likely that the lists are not absolutely correct, owing to the frequency of changes, the figures are none the less interesting.

	Druggists, retail.	Physicians.
Alabama.....	328	1,294
Arkansas.....	505	1,125
California.....	667	1,819
Colorado.....	120	191
Connecticut.....	818	937
Dakota.....	417	505
Delaware.....	85	166
District of Columbia.....	141	426
Florida.....	221	481
Georgia.....	200	1,750
Idaho.....	43	56
Illinois.....	1,720	3,578
Indiana.....	1,578	3,596
Iowa.....	1,817	2,869
Kansas.....	1,360	2,437
Kentucky.....	757	2,079
Louisiana.....	175	800
Maine.....	371	908
Maryland.....	398	1,439
Massachusetts.....	1,171	3,076
Michigan.....	1,407	2,871
Minnesota.....	644	1,107
Mississippi.....	60	1,500
Missouri.....	1,651	3,551
Montana.....	57	139
Nebraska.....	688	951
Nevada.....	30	120
New Hampshire.....	181	562
New Jersey.....	548	933
New York.....	1,480	4,358
<i>(Excepting New York City and Brooklyn.)</i>		
New York City.....	708	2,528
Brooklyn.....	331	896
North Carolina.....	60	1,200
Ohio.....	1,880	4,799
Oregon.....	187	392
Pennsylvania.....	2,356	6,234
Rhode Island.....	80	440
South Carolina.....	234	640
Tennessee.....	504	2,110
Texas.....	934	2,048
Utah.....	23	68
Vermont.....	165	577
Virginia.....	537	1,918
Washington.....	113	243
West Virginia.....	163	672
Wisconsin.....	808	1,627
Totals.....	27,651	71,461

The Manufacture of Ferrocyanide of Potassium.

DR. J. B. READMAN recently read a paper on this subject before the British Association, of which the following comprises the principal portion:

As far as I am aware, very few thorough investigations have been conducted during late years with the view of arriving at a more economical method of producing this important commercial salt.

There is, perhaps, no chemical operation carried on on the large industrial scale which is so wasteful and so scientifically imperfect. The wear and tear, the loss of nitrogen, the excessive consumption of coal, and the loss of potassium by volatilization, lixiviation, and its recovery, are each and all so abnormal under the present process of manufacture that it is matter for surprise that the process has so long survived in an age characterized by rapid strides of progress in almost every other branch of chemical industry. During the last decade or more, a very great deal of attention has been paid to the recovery of ammonia from blast-furnace gases and coke ovens, and to increasing the yield of ammonia during the destructive distillation of coal and of shale, but little or nothing has been done in the direction of saving or utilizing the ammonia or the nitrogen evolved in the manufacture of ferrocyanide of potassium.

It has been stated that out of every 100 parts of nitrogen existing in the animal matters employed in this manufacture, only 45 to 50 parts are utilized, and that the remaining 50 to 55 parts are lost, passing off, not as ammonia to any great extent, but principally as free nitrogen.

Yellow prussiate is, commercially at least, the starting-point of the manufacture of the cyanides and ferrocyanides, and although much of its importance, especially as a means of preparing blue pigments, has gone, it is still a substance of considerable manufacture.

Before giving a short review of the history of prussiate, and of the methods that have been proposed or practised to improve the process of manufacture, it may be well, in

the first place, briefly to describe the process at present in use in this country.

Present Mode of Manufacture.—It consists in introducing dry nitrogenous animal matter, such as horns, hoofs, woollen rags, leather, etc., into molten carbonate of potash contained in a small but very thick and heavy (15 cwt.) cast-iron pot, heated externally by a strong fire. The pot is provided with an iron agitator, which is kept constantly in motion during the operation. The nitrogenous material is introduced into the pot slowly, and in small quantities at a time. The carbon and nitrogen combine together, forming cyanogen, which in turn combines with the potassium, forming, some authorities say, cyanide, others ferrocyanide, of potassium.

The mouths of the pots are practically open to the air, and at each addition of nitrogenous material a flame shoots forth carrying with it a large proportion of the nitrogen. It is at this stage of the process that the chief waste of nitrogen takes place.

The iron required for the formation of the salt is derived wholly from the cast iron of the pots and agitators, and this wear, aggravated by the presence of sulphur in the organic matter, and by the high temperature at which it is necessary to conduct the operation, renders the working life of the prussiate pots a very short one.

The fused mass, after the nitrogenous matter has all been introduced (called "metal"), is ladled out of the pots. It is then allowed to cool, and is lixiviated much in the same way as black-ash is treated in the Leblanc soda process. The "metal" contains cyanogen equivalent to about 16 per cent to 20 per cent of ferrocyanide of potassium, which may exist, as before remarked, as cyanide, but on lixiviation becomes ferrocyanide by double decomposition—



and about 60 per cent of carbonate of potash in excess, called "return alkali," the remainder, 20 per cent to 24 per cent, being insoluble matter, chiefly carbon.

The clear liquor from the lixiviating vats is boiled down, and a first crop of crystals of yellow prussiate is thereby obtained. These crude crystals are then recrystallized at least once to fit them for the market. The mother-liquors obtained from the first crystallization are evaporated down and put through the process again. Afterwards, when they become very foul from accumulation of sulphides and other salts, they are evaporated to dryness and put through the black-balling furnace for recovery as carbonate of potash.

The insoluble residue from the lixiviation of "metal," consisting largely of carbon derived from the animal matters, was formerly a waste product; but it has recently become of value as a substitute for animal charcoal in the decolorizing of paraffin wax.

Historical.—It appears that Prussian blue was first produced in England in 1724 by Woodward, who obtained it by deflagrating a mixture of nitre and argols, and calcining the product with dry blood. Further investigations were made by Scheele some years later; also by Berthollet in 1787, Porret in 1814, and by Gay-Lussac in 1815, who discovered cyanogen.

Attention was paid to the manufacture of prussiate by Muspratt in 1820, and by Kuhlmann in 1838, who was the first chemist to propose the making of cyanogen by passing ammonia over red-hot carbon and condensing the cyanogen so formed in alkaline solution.

Lewis Thompson, of Newcastle-on-Tyne, about fifty years ago, was the first to draw attention to the production of cyanogen when coke, iron, and potash were ignited in free access of air.

Bramwell and Hughes about this time (1844) started the process in Newcastle of producing cyanides by passing air over a dried mixture of carbon saturated with potash and heated to a high temperature.

Bunsen and Playfair detected cyanogen in the gases of the Alfreton iron furnaces a little above the tuyères, and Bunsen proposed the erection of a potash blast furnace, with air blast, for the production of cyanide of potassium. At the meeting of the British Association held in Cambridge in 1845, a "Report on the Gases evolved from Iron Furnaces," by Professor Bunsen and Dr. Lyon Playfair, was read. The following extracts are taken from the report:

"It will be observed that the gases from the inferior parts of the furnace contain cyanogen. . . ."

"This gas appears immediately over the point of entrance of the blast, and again disappears at a small elevation above it, so that at the top of the bushes only small traces of it are observed."

It appears from the report that a hole was bored over the front of the furnace 2 feet 9 inches above the level of the tuyère, and as soon as the perforation was complete a gas issued from it, possessing strong illuminating powers and burning with a yellow flame, from which came abundant vapors of white smoke. An iron pipe was introduced into this hole, and the gases which poured out of the tube, under a pressure of several feet of water, were so richly laden with cyanide of potassium that precautions had to be taken in approaching it that the experimenters should not suffer injury from this poisonous material.

Some Woulff's bottles were arranged and connected with

the pipe. In the first bottle, which was originally empty, a rich white sublimate of dry cyanide of potassium was deposited, while water contained in the second bottle became a tolerably strong solution of the same salt.

The potash, on further investigation, was found to come from the calcined iron ore and from the coal employed. The experiments proved (1) that the nitrogen of the cyanide was not derived from the nitrogen contained in the coal, as the temperature at that part of the furnace must have previously deprived the coal of all its nitrogen; and (2) that cyanide of potassium is volatile at high temperature.—*Journ. Soc. Chem. Ind.*, 1889, 757.

Statistics of the Paris Public Charitable Institutions.

OFFICIAL documents, just published, afford an interesting insight into the workings of the Parisian service of public charities. During the last fiscal year 406,213 persons were assisted, 137,900 of whom were hospital (11,739 beds) and 87,300 out-door patients. There were also nearly 15,000 inmates of asylums, some 55,000 children, and 19,000 accouchement cases attended to at home, besides indigents, etc., assisted at their houses. The population being estimated at 2,344,500, the aggregate (more than 1 in 11 apparently) seems very large, but it should be borne in mind that the same person appears often more than once under different headings. The budget for the current year is 41,417,600 f., more than many a small state can dispose of. The hospital and asylum medical staff consists of 88 physicians, 40 surgeons, 9 alienists, 9 accoucheurs, 22 pharmacists, 212 medical and 133 pharmaceutical internes, and 8 dentists. And, finally, there are 35 hospitals, 16 pharmaceutical and 13 clinical laboratories. On comparing the London and Paris statistics for 1885, it turns out that, by a strange coincidence, the cost of public charities is nearly the same for both in proportion to the population, namely, 13.60 f. in London and 13.54 f. in Paris for each inhabitant.—*Chem. and Drugg.*

The Knop-Huefner Method of Estimating Urea.

IN the quantitative estimation of urea by means of sodium hypobromite, a part of the nitrogen remains behind and does not pass into the collecting tube. Part of this is oxidized to form nitric acid; another part remains unoxidized, and is present in such a form that on boiling with alkalis it is evolved as ammonia.

Fauconier was the first who pointed out that nitric acid was formed. According to the method he employed, however, he did not exclude the possibility of its formation by the action of potassium chlorate from unaltered urea or a cyanate. In the research on this subject made by R. Luther (published in *Zeitsch. f. physiol. Chem.*, 18, 500), the following method was employed: Urea was warmed with excess of barium hypobromite until gas ceased to come off; silver sulphate in excess was added to the liquid, by which means silver bromide, bromate, and oxide, barium sulphate, and perhaps some bromate were precipitated. Barium hydroxide was then added; silver oxide and barium sulphate were thus precipitated; excess of barium hydroxide was precipitated by carbonic anhydride and filtered off. The filtrate contained now only barium nitrate, the estimation of which showed that at least 3 to 4 per cent of the nitrogen of the urea had been oxidized to form nitric acid. This source of error can, however, be avoided by addition of glucose to the solution of urea, as it reduces nitric acid *in statu nascendi*.

There appear, however, to be no means of preventing the loss of the remainder of the nitrogen. The nitrogen which is contained, probably either as a cyanate or cyanurate, or as a compound with sodium bromide or bromate, is driven off as ammonia on heating with alkali. The loss of nitrogen in this way amounts to about 1.5 per cent.

The amount of these losses varies, however, with the concentration, temperature, presence of other substances in solution, and so forth, rendering the hypobromite method of accurately estimating urea, therefore, a most uncertain one.—*J. Chem. Soc.*

Awards at the Paris Exhibition.

THE following awards are announced as being made to exhibitors from the United States:

CLASS 45.—CHEMICAL AND PHARMACEUTICAL PRODUCTS: *The Grand Prize*—none. *Gold Medal*—Boston Rubber Shoe Co., Cheseborough Manufacturing Co., Devoe & Co., F. S. Pease, Revere Rubber Co., Solvay Process Co., Valentine & Co. *Silver Medal*—Borne, Scrimser & Co., Brown & Co., Cotton Oil Product Co., Fairchild Brothers, Seabury & Johnson, Upton, W. R. Warner & Co.

CLASS 28.—PERFUMERY: *Grand Prize*—none. *Gold Medal*—Colgate & Co., Ladd & Coffin. *Silver Medal*—Geo. Lorenz, Theo. Ricksecker.

In the section of educational institutions, the Massachusetts and Philadelphia Colleges of Pharmacy were each granted a silver medal.

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EDITORIAL.

ONE of the questions which will engage the attention of the next pharmacopœial convention is the problem of "standardized drugs and preparations." There is considerable pressure being brought to bear, even at this time, upon the members of the medical and pharmaceutical professions, by the advocates of an extended series of standardized articles. It is, however, plain to the unbiased observer that these efforts almost exclusively emanate from manufacturing houses, or from members of the medical profession who favor this plan on theoretical grounds. It is safe to say that the vast majority of the pharmaceutical profession, including its best representatives, while willing to proceed steadily in the direction of assayed remedies, are not prepared to make the hazardous jump from unassayed to accurately standardized remedies at one bound. It must not be forgotten that the new generation of pharmacists, who have received a professional education enabling them to perform chemical assays, is only gradually taking the place of the old generation, and that some time will elapse before the change will have extended to a majority. It would be neither wise nor practical to require preparations which had formerly been made, without assay, with reasonable uniformity of strength by every practising pharmacist, suddenly to be of such scientific accuracy that their manufacture would necessarily be thrown almost exclusively into the hands of a few large manufacturing houses who have all the facilities on hand for conducting assays, even though the latter be tedious. No unbiased looker-on will deny that there has been a most marked progress among the pharmacists of this country in matters of professional education, and when occasion has demanded of them the acceptance of higher conditions and more exacting duties, they have willingly accepted them, or even imposed them upon themselves. They will undoubtedly be equally willing to meet those who advocate assayed remedies with a liberal spirit, but they will insist that common sense, and not purely scientific technicalities or perhaps commercial considerations, shall be arbiters in the matter.

Leaving out of consideration, for the present, all drugs and preparations of inorganic origin, we find that the last Pharmacopœia prescribed fixed percentages of active principles and also assay processes for cinchona and opium only. No one complained of the existence of these pre-

scribed assays, since their necessity here is plain and evident. Moreover, the methods of assay are comparatively easy and the result can be verified in various ways. There will probably be not the least objection if the next committee should prescribe a process of assay for nux vomica, ignatia (if retained), belladonna, and a few other energetic *crude drugs*. But most serious objection would be raised if *every* crude drug containing an active principle capable of being assayed were accompanied by such a process of assay, and possibly by directions as to how much of the active principle it should contain, or by directions requiring it to be taken in such proportions that the several preparations derived from it shall always contain an absolutely uniform percentage of active principle. It is well known that there is as yet no process by which *digitalis* can be assayed, simply because there is no sure method of separating the really active principles unmixed with others. If we are, therefore, necessarily compelled to omit a process of assay for *digitalis* and its preparations, and if, in spite of this omission, the medical profession is willing to continue the use of the drug and its usual preparations, then why should we force upon ourselves a laborious assay in the case of many other much less important drugs, when it is known beforehand that the time and labor would be thrown away? There may be a few physicians (we know several, in fact) who would take note of the existence of assayed drugs and preparations, and arrive at a more definite knowledge of their therapeutic effects in given doses; but does anybody believe—from past experience of changes in pharmacopœial preparations—that the medical profession, as a whole, or in its large majority, would pay any attention to it? As it is, their attention is so entirely absorbed by the ever-increasing field of other professional themes that they would simply ignore, or at least soon forget, the existence of these accurately adjusted remedies.

There is a very serious objection against an official demand of standardizing many *preparations*. Lest we be misunderstood at the outset, we would say, right here, that we have no objection whatever to an assay when we can be sure not only of the *quantity* but also of the *identity* of the product. In assaying solution of soda, we can readily do both. In assaying opium, we are also able to do it. In assaying ipecac, colchicum, lobelia, etc., *provided we start from absolutely genuine drugs*, which we have inspected and handled ourselves, we can likewise do it; but the assay in these cases, unless executed upon a large quantity of the drug, merely enables us to estimate the *percentage* of active principle, which we usually *assume* to be that which is characteristic of its respective drug. We do not usually, and in most cases cannot, subject the product of the assay to any reactions of *identity*. Yet this is immaterial, since if we started from, say, a prime quality of ipecac, having every evidence of being genuine, we are fully justified in assuming the final precipitate to be or to contain the emetine which we know is the active principle. But supposing we had *purchased a ready-made* fluid extract of some particular drug, and we were to subject a small portion—such as is usually taken for this purpose—to an assay, using some of the usual alkaloidal precipitants, for instance potassio-mercuric iodide. Have we any sure proof, if we do obtain the expected precipitate, that the fluid extract was originally made from that drug alone? Assuming that it was actually intended to append a process of assay, say, to Fluid Extract of Lobelia, there appear to be only two ways in which the required standard of strength could be expressed. Leaving aside all technicalities and omitting details of assay, the two alternatives could be expressed as follows:

I. On diluting 20 C.c. of Fluid Extract of Lobelia with distilled water to . . . C.c., with addition of . . . drops of sulphuric acid, a [certain] portion of the solution, when tested with [a certain amount of] potassio-bismuthic iodide, should give a distinctly perceptible turbidity or precipitate.

II. On diluting 20 C.c. of Fluid Extract of Lobelia with distilled water to . . . C.c., with addition of . . . drops of sulphuric acid, a [certain] portion of the solution, when tested with [a certain amount of] potassio-bismuthic iodide, should give a distinctly perceptible turbidity or precipitate of lobeline in combination with the precipitant.

Now, the mere requirement, in No. I., that there shall be, under certain conditions, a precipitate, is worthless in the case of a preparation *purchased ready-made*, since there may have been various foreign organic substances added to the fluid extract, causing a precipitate with the reagent, such as was expected to occur in presence of lobeline. And in No. II., where the precipitate is distinctly stated to consist of lobeline, etc., it would be necessary to supplement the information by reactions of identity and *proofs of the absence of other substances*. Unfortunately, there are only a very limited number of alkaloids for which such rigorous tests could be established.*

In a number of States of the Union, the dispensing pharmacist is, by law, made responsible for the quality and identity of the medicines he dispenses and sells. If the Pharmacopœia should, at one leap, establish definite standards for *preparations* involving methods of assay requiring special training and considerable experience, a large portion of the profession would be placed between the horns of a dilemma. On the one hand, a great number of them would not as yet be in a position to make such assays reliably themselves, and, on the other hand, they would be themselves punished if preparations, bought as assayed, in the market, should be found defective.

We have intimated that we have not the least objection to *assayed drugs*. We are glad some progressive firms put upon the market powdered drugs with statement of the assay, and we are perfectly willing to agree that the Pharmacopœia shall demand of certain crude drugs a definite percentage, with addition of a process of assay. Most of us have to buy our crude drugs in the market, and we might just as well buy them assayed, or, if we can, assay them ourselves. And if we make our preparations *ourselves* from such assayed drugs, we will surely all obtain tolerably identical preparations, more accurate than those at present in vogue, but not of such pedantic accuracy that we cannot trust ourselves to make them. To go further at present, and to demand the introduction of a large number of assayed *preparations*, would be a grievous mistake as well as wrong. We are perfectly willing to accept those in which the element of doubt as to identity is excluded, and where there is a toxic principle. For instance, we have no objection against an assayed tincture of nux vomica. In fact, we advocate this. But we are opposed—at this time at least—to such preparations as assayed tinctures or fluid extracts of hyoscyamus, conium, colchicum, stramonium, and many others. Possibly in 1900, when the Pharmacopœia will again be revised, the profession will have made progress enough to bear an additional load.

In replying to one of our correspondents, who sent us a query on Tincture of Nux Vomica (see our last volume, page 219), a singular oversight has made us say that the officinal tincture is made from the extract. Of course this is not so. It is made from the powdered seed, but it is adjusted on the basis of an extract, or it might be said that it is made as if from an extract. In explaining how the error arose (it was discovered too late to make a correction in the type), we wish to draw attention to a method of making tincture of nux vomica casually alluded to by one of us many years ago (in Report on the Revision of the U. S. Ph.—Amer. Pharm. Assoc.—New York, 1880, page 171), viz., by dissolving the alcoholic extract in alcohol. Of course, the alkaloidal strength of the extract should be known. Now it so happens that we have during the last fifteen years made our tincture of nux vomica from an *assayed extract* exclusively, and have found this the most easy and satisfactory method, always yielding a uniform product. As we use an *assayed* extract, we adjust the strength of our tincture upon the average quantity of alkaloids contained in the 2 per cent of extract which the U. S. Pharm. tincture is directed to contain. That is, we make the tincture contain, practically, 1 grain of the total alkaloids in 1 fluidounce of the tincture.

Every pharmacist ought to be able to assay such a preparation as an extract of nux vomica, as this is neither a difficult nor a tedious undertaking, if both alkaloids (mixed) are to be determined. Those who have neither the necessary experience nor facility may, however, easily obtain an extract, of a uniform strength (with statement of the assay), from several reliable houses.

In the case of nux vomica, which is a drug that is only rarely exhausted of its full medicinal principles, when percolated on a small scale, we believe it to be perfectly justifiable to depart from the official directions, since this will, with due care, lead to greater accuracy.

* The case of lobelia has been given merely as a general example. It is not to be inferred that the particular reagent mentioned is actually the best precipitant for lobeline. But in most cases, some one of the regular alkaloidal precipitants will have to be used, varying according to the particular principle to be precipitated.

QUERIES & ANSWERS.

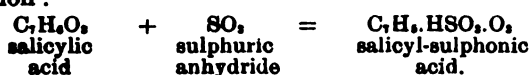
Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,396.—Eau de Cologne (W. B. C., Conn.).

The formula for cologne water referred to can be found on page 180 of the AMERICAN DRUGGIST for September, 1889.

No. 2,397.—Salicyl-sulphonic Acid (Dr. M.).

A note on this substance, which has recently been recommended as a new reagent for albumin in urine, will be found in the present number of this journal. It may be prepared in various ways. Either by mixing together equal molecules of sulphuric anhydride (anhydrous sulphuric acid) and salicylic acid, and allowing the mixture to stand until it becomes liquid by abstracting moisture from the air. Or by warming 1 mol. of salicylic acid with enough concentrated sulphuric acid to correspond to 1 mol. of H_2SO_4 . By conversion into a barium salt, and decomposition of the latter, the new compound—containing "sulphonic acid" (HSO_4)—crystallizes out in long, thin needles, which are soluble in water and alcohol in all proportions. The reaction is expressed by the following equation:



The product is exceedingly stable, remaining unchanged even when heated with nitric acid. It gives a deep-violet reaction with ferric chloride, similar to that produced by salicylic acid.

No. 2,398.—Is Antipyrine Patented or not? (Philadelphia).

To answer this question, it is necessary to refer to the patent laws of the different countries. In Germany, where antipyrine was first prepared, only the process by which a chemical product is reached can be patented, but not the product itself. Therefore, anybody who can prepare the substance by a different process has the right to make it and to sell it. But if the first patentee's product has a trade-marked name, the second manufacturer will have to give to his product a new name. In the United States, England, and some other countries, on the other hand, both the process and the product can be patented.

We have recently had considerable correspondence and discussion regarding the new synthetic chemicals and the degree of protection which they enjoy under the patent laws, and we have found that *a-priori* conclusions as to what common sense or equity should expect of patent laws not unfrequently lead one astray. It is necessary to refer constantly to the several laws, and to the decisions of patent bureaus and courts, in order to avoid tumbling into pits. To those who wish to post themselves in this direction we can recommend an important pamphlet, recently published by one of the best experts on chemical patents, Dr. Otto N. Witt, of Berlin, entitled "Chemische Homologie und Isomerie in ihrem Einfluss auf Erfindungen aus dem Gebiete der organischen Chemie" (8vo, Berlin, 1889, pp. 96).

No. 2,399.—Hæmoglobin as a Ferruginous Tonic (Baltimore).

So far as we know, hæmoglobin has not been used in any hospital or in the private practice of any noted authority on therapeutics in this country as yet. It has been reported (in Merck's "Bulletin," No. 9) to have been experimented with in the Paris hospitals for over a year, with "exceedingly favorable results." From the above-mentioned pamphlet we append the following: The chemical form and combination in which iron exists in hæmoglobin is thought to be such as to make the iron particularly easy of assimilation into an organism to which hæmoglobin is given by the stomach. Hence the use of hæmoglobin as a chalybeate has been attempted in cases of disease where an atonic condition of the digestive tract impedes the assimilation of medicines; notably in certain cases of anemia and of chlorosis. Deschiens recommends the following formulæ:

Hæmoglobin..... 100 Gm.—6 oz.
Syrup..... to make 1 Litre—33½ fl. oz.

Dose: Two to four tablespoonfuls per day for adults, half quantity for children. Each tablespoonful contains 2.85 Gm., or 43 grains, of hæmoglobin, corresponding to 0.0123 Gm., or 0.19 grain (nearly $\frac{1}{5}$ grain), of metallic iron.

Another formula given directs some generous white wine to be used as vehicle.

Some persons disliking the hæmoglobin odor, it has been deemed advisable to administer it, in these cases, in coated pills flavored with peppermint.

As to the cost of hæmoglobin, we find it quoted in Merck's "Index" at forty cents per gramme, which price would be probably reduced for larger quantities. The cost is, however, prohibitive to its general use as a chalybeate.

No. 2,400.—Creosote (M. A.).

The U. S. Pharmacopœia gives the specific gravity of creosote as being between 1.085 and 1.088. These figures were based upon experiments made with creosote obtainable in the market a number of years ago. Recently much more attention has been paid to the quality of creosote put on the market, and a more accurate upper and lower limit of specific gravity can now be made. Creosote, when pure, is mainly a mixture of guaiacol and cresol (not cresol, which exists in coal-tar, while cresol does not). Pure guaiacol has the specific gravity 1.117 at 15° C., and pure cresol that of 1.089 at 13° C. It will, therefore, be seen that a mixture of the two, if unmixed with anything else, should not have a specific gravity lower than that of cresol. Still, creosote does contain some other constituents, which apparently lower its specific gravity, and it is proposed by W. Brandes (in *Arch. d. Pharm.*) to fix the specific gravity at 1.070-1.080.

Besides the usual pharmacopœial tests (with collodion or glycerin), the following is recommended as an exceedingly reliable test by Hartmann & Hauer, large manufacturers of beechwood tar creosote:

If 2 C.c. of creosote, 4 C.c. of petroleum benzin, and 4 C.c. of a cold saturated solution of barium hydrate are shaken together, the benzin solution should not assume a blue or dirty, nor the aqueous solution a red color. Any of these color reactions would point to the presence of undesirable constituents derived from beechwood tar. In making this test (we quote from the translation of the original in *Notes on New Remedies*), it will be found that the mixture will either separate in three layers—barium-hydrate solution, creosote, and benzin—or in only two layers, barium hydrate and a solution of creosote in benzin. These varying conditions are explained by the fact that an impure guaiacol is insoluble, but a pure cresol soluble, in benzin. If these two constituents are present in the necessary proportion, solution is to a certain degree promoted by the cresol. But solution (or "perfectly suspended mixture") does not ensue if the creosote contains a particularly large percentage of guaiacol—or of phenol or cresol (from coal-tar), since phenol and cresol, either alone or in mixture, are insoluble in benzin [?]. If the absence of phenol or cresol is proven by the glycerin test, the separation of the mixture into three layers proves a large percentage of guaiacol in the creosote, and consequently its good quality.

No. 2,401.—Chilblains (M. S. M.).

Simple cases of chilblains, when the skin is not broken and there is no sign of suppuration, may often be cured by the application of simple emollients, neutral ointments, or astringents, as may be required. We select a few which are quoted by Dr. H. Paschke in his work on cosmetics:

1. Yellow Wax..... 5 parts.
Spermacei..... 5 "
Oil of Almond..... 20 "
Borax, powdered..... 1 part.
Benzoic Acid..... 4 "
Glycerin..... 7½ parts.
Distilled Water..... 1½ "
Oil of Rose..... q. s.

Dissolve the borax and benzoic acid in the glycerin and water with a gentle heat. Allow to cool, incorporate the other ingredients, and flavor.

2. Tannic Acid..... 2 parts.
Alcohol..... 5 "
Collodion..... 20 "
Tinct. Benzoin..... 2 "

Dissolve and mix. Apply with a brush.

3. Tinct. of Iodine..... 1 part.
" " Galls..... 1 "
4. Tinct. of Iodine..... 5 parts.
Collodion..... 100 "
5. Tinct. of Iodine..... 10 parts.
Sol. of Chlorinated Soda..... 80 "
6. Tinct. of Iodine..... 2 parts.
Glycerin..... 100 "

All to be applied with a brush.

No. 2,402.—Antifebrin and Antipyrine (Philadelphia).

Both antifebrin and antipyrine are official in the new Austrian Pharmacopœia (also in the Hungarian, Croato-Slavonian, and Dutch). For the benefit of our subscriber and the body he represents, we append a translation of the two articles from the Pharm. Austr.:

ANTIFEBRINUM—Antifebrin.
Acetanilidum—Acetanilid.

Crystalline lamellæ, colorless and odorless, of an unctuous gloss, having a faintly burning taste and a neutral reaction. They are difficultly soluble in cold, more soluble in hot water, easily in alcohol and ether, melt at about 112° C., are volatilized without decomposition at about 295°, and when ignited on platinum leave no residue.

Antifebrin is soluble, at a gentle heat, in concentrated sulphuric acid; the solution should be colorless. When boiled with a concentrated solution of potassa, it is decomposed, aniline being separated. On heating a small portion of antifebrin, in a test tube, with a piece of fused

potassa, a drop of oily, yellow aniline separates on the surface of the melted mass. If the latter, after cooling, is treated with distilled water and an excess of diluted sulphuric acid, the solution acquires a violet tint after addition of a few drops of chlorine water.

ANTIPYRINUM—Antipyrine.

Phenyldimethylpyrazolonum—Oxydimethylchinicinium.

A white, crystalline powder, or crystalline lamellæ of an unctuous gloss, odorless, of a bitter taste; easily soluble in water, alcohol, and chloroform, much less soluble in ether, and of a neutral reaction. Antipyrine melts at 111° to 115° C., and when ignited on platinum leaves no residue.

The aqueous solution, treated with a drop of solution of ferric chloride, assumes a deep-red color, which is changed to yellowish by the addition of a few drops of concentrated sulphuric acid.

The dilute aqueous solution turns bluish-green upon addition of a solution of potassium nitrite acidulated with diluted sulphuric acid.

No. 2,403.—Drainage Tubing (Dr. McD.).

One of our medical correspondents asks us whether we can account for the fact that the ordinary vulcanized rubber tubing when used for surgical drainage almost always causes irritation at the orifice of a wound, sometimes going so far as to produce a sort of charring, or at least blackening, of the edge of the wound, while red tubing does not cause this trouble.

In reply to this query we would say that we had our attention directed to this matter some time ago, and believe we can point to the cause. Since drainage tubing is an article kept in stock by many druggists, and the above-mentioned trouble must have been noticed by many practitioners, it will be doing a service to both to give them what information we possess on the subject.

In the first place we wish to say a few words on rubber tubing in general.

There are various kinds of rubber tubing in the market. First, so-called "pure rubber" or "pure gum" tubing. This is, however, not meant in the sense of "made of pure rubber, without being vulcanized," but means "made of rubber, vulcanized, but free from fillings." While it is possible to make tubing of pure, unvulcanized rubber (and such tubing may occasionally be found), yet it is so little permanent and resistant that it is not made for the regular market. All commercial tubing, therefore, is more or less vulcanized. The "pure gum" tubing differs from the ordinary whitish, vulcanized tubing in this, that the latter contains more or less of cheap diluents, such as oxide of zinc, sulphate of barium, alumina, etc.

All vulcanized articles, whether "pure gum" or "filled," become coated, on exposure to the air, with a film of sulphur, the amount of which is in direct ratio to the quantity contained in the vulcanized mass. On "pure gum" tubing this is readily seen by its being coated gray. This superficial film of sulphur, which is both on the outside and inside of the tubing, may be permanently removed by boiling the tubing for about twenty minutes in the following solution:

Sulphite of Sodium.....	1 lb.
Soda, caustic.....	1 "
Water.....	1 gallon.

The tubing must be properly coiled in the vessel containing the liquid, and each length of tubing must alternately be thoroughly washed out interiorly by lifting out one end, attaching this to a little funnel, and pouring some of the hot solution into it, so that a current of the liquid will occasionally pass through the whole length of the tubing. Finally the tubing is taken out, and thoroughly washed with hot and cold water. It will now appear black and will remain so.

Red tubing is made in several ways. Either the coloring agent—usually red sulphide of antimony—is added, in sufficient quantity to produce the desired tint, to the mixture of rubber with sulphur (instead of sulphur, certain liquids containing sulphur are often taken, such as chloride of sulphur, carbon disulphide, etc.). In this case the vulcanization is dependent not so much upon the sulphur in the sulphide of antimony as upon the other sulphur present. Such tubing, when kept for some time, likewise becomes covered with a coating of sulphur, and may be treated like that before mentioned to purify it. But that kind of red tubing which is vulcanized with sulphide of antimony exclusively (certain other sulphides are occasionally used, such as cinnabar) does not throw off a film of sulphur. It is a much more difficult mass to handle, and most manufacturers find it impracticable to turn it out in as long pieces as the ordinary tubing. The best quality of red tubing is that used for making catheters, for instance. These are vulcanized in glass tubes, in order to have the exterior as smooth as possible.

Now to come back to the "drainage tubing." We have found by experience that any tubing which throws off free sulphur acts as an irritant to wounds. And tubing which does not throw off sulphur never irritates. The conclusion is forced upon us that it is the sulphur which causes the trouble. This is rendered more probable still

by the fact that tubing, of which a portion has been found to produce irritation, had subsequently failed to produce any after the superficial coating of sulphur had been removed in the manner pointed out above.

It may be asked next, how does the sulphur produce irritation, and sometimes a caustic effect? Here we can only advance a theory, which it would, however, not be very difficult to test, if some surgeon should take the trouble to try it. We believe that the sulphur, in contact with the pus and other organic liquids, and also in contact with the air, is oxidized gradually to sulphuric acid, which, though in minute quantity, is easily able to produce the phenomena pointed out.

It follows, therefore, that only purified "pure gum" tubing, or, better still, the best "red (or maroon) tubing" (not vulcanized with sulphur), should be used as drainage tubing.

No. 2,404.—Cortex Dictamni (Subscriber).

"Subscriber" sends us the copy of an old recipe in which one of the ingredients is "Cortex Dictamni," and he wishes to obtain information about it.

Several kinds of "Dictamnus" have been used, medicinally, in Europe. One of these is *Dictamnus albus* L., nat. fam. Rutaceæ, native of middle and southern Europe and Asia Minor. Of this plant (perennial) only the root has been used. It has a faint aromatic odor and a slightly bitter taste. It was reputed to be an antispasmodic and diuretic. Another has been known as "Dictamnus Creticus." This is, however, not a *Dictamnus* proper, but an *Origanum*, viz., *Origanum Dictamnus* L., a labiate plant found in Crete and other places of the Grecian archipelago. Of this, the whole herb—which has an aromatic odor and corresponding sharp taste—has been used. The first mentioned, therefore, yields the *Radix Dictamni*, the second the *Herba Dictamni*. Both of these are now nearly out of use, and most likely could be procured only by sending an order to some large drug house in Europe. We never heard of any "Cortex Dictamni," nor do we believe there is such a thing, since *Dictamnus albus*, the only European species, only grows about 3 feet high and would scarcely yield a crop of "bark." The other ingredients mentioned in the recipe make it probable that the *Herba Dictamni Cretici* is meant. By the way, this forms one of the ingredients of theriac, and is, for this reason, still official in the French Pharmacopœia.

No. 2,405.—Kerner's Test for Sulphate of Quinine (Importer).

The chief test prescribed by the U. S. Ph. for Sulphate of Quinine is practically identical with that originally proposed by Kerner, and the same test, sometimes with slight modifications, has also been adopted by the German and several other foreign pharmacopœias. The last French Pharmacopœia introduced one change which is deemed of some importance. Instead of macerating the sulphate of quinine with distilled water at 15° C., it is there directed to be macerated at a gentle heat (by plunging the test tube into warm water), though the filtration, etc., must be done at 15° C. This maceration at a higher temperature breaks up the intimate compounds which sulphate of quinine is apt to form with other cinchona alkaloids (as sulphates) when they are crystallized together.

More recently Drs. Kerner and Weller have further improved the method, so that it now even receives the approval of Hesse, who has formerly entertained some objection against the test. This new method is as follows:

Expose a suitable quantity of sulphate of quinine to a temperature of 40° to 50° C. (104° to 122° F.) until it is completely effloresced, then put 2 Gm. of it into a test tube, together with 20 Gm. of distilled water, place the tube into a water-bath at a temperature of 60°–65° C. (140° to 149° F.), and leave it there half an hour, frequently shaking. Then transfer the test tube to a bath kept at 15° C. (59° F.) and leave it there two hours, repeatedly shaking. Now filter off 5 C.c. into a test-tube, and add just enough water of ammonia of spec. grav. 0.960 (and at 15° C.) to dissolve the quinine which had at first been separated, avoiding an excess [and also avoiding violent shaking; the test tube should be merely inverted once or twice—Ed. Am. Dr.]. Not more than 8 C.c. of the ammonia should be consumed.

Now, this test, although considerably sharper than the one now official in the U. S. Ph., is not claimed to indicate very small percentages of sulphate of cinchonidine—which is, at present, the most usual impurity, since most of the manufacturer's bark contains this alkaloid, and but a small proportion contains any cinchonine or quinine. In fact, it is probable that if less than 7 per cent of sulphate of cinchonidine is present, the test would fail to show it. But this seems to be about the limit to which the purity of sulphate of quinine can be brought by mere crystallization. If the rest of cinchonidine is to be removed, other means must be resorted to (conversion into bisulphate, etc.) which materially enhance the cost. And it is generally agreed that the presence of not more than about 7 per cent of cinchonidine sulphate, which itself has similar medical properties to sulphate of quinine, does not sufficiently impair the effect of the latter to render the removal of the impurity imperative. It will, therefore, be most probably allowed to retain the stated amount of the other alkaloid.

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[ORIGINAL COMMUNICATION.]

REMARKS ON THE DIGEST OF CRITICISMS ON THE U. S. PHARMACOPOEIA.

BY PROF. CHAS. T. P. FENNEL, OF CINCINNATI, OHIO.

[Continued from page 8.]

THE provisional List of Articles recommended to be introduced contains a large number of preparations possessing hypnotic and anæsthetic properties. Considered from a chemical standpoint, they are all closely related, being methane derivatives. The first of the saturated hydrocarbon series is CH_4 . This compound is naturally the simplest form of a hydrocarbon, and forms the basis of other compounds. Taken as a class, they were always considered of the greatest importance, both in medicine and chemistry. Of the chlorinated anæsthetic compounds, that which is recognized as the most powerful is

Chloroform, Trichloromethane (CHCl_3). The pharmacist is not expected to prepare this compound, but required to purify the commercial product. This commercial product is not always preserved with the greatest caution, and consequently undergoes more or less decomposition in proportion to the exposure to air and light. The products of decomposition (hydrochloric, hypochlorous, and formic acids) and probable impurities (alcohol, aldehyde, and chlorine compounds) are eliminated with the greatest difficulty. The official process for purification is a very reliable and satisfactory one, provided the same is carefully conducted. In the details of the process the wording should be, "Distil, by means of a water-bath containing water at the temperature of 160°F ., into a well-cooled receiver." "Continue the distillation, until nearly dryness, at a temperature not exceeding 150°F ." In the process of distilling, it is necessary that the entire quantity of chloroform distills at once. Gradual increase of temperature admits of the distillation of aldehyde before its chlorination. The boiling point of chloroform, determined according to the method of Dr. Fischer, whose process of purification is the official one, was 59.6°C . According to Allen, the boiling point, 59.8°C ., indicates one-half per cent alcohol. The U. S. P. tests for purity are all reliable, unless there be a complete absence of alcohol. Iodide of potassium will not react for free chlorine. Careful preparation and thorough purification of this compound are of the utmost importance, especially where the preparation is intended for internal administration. Of the official compounds into which chloroform enters, the Mistura Chloroformi should be discarded. Corresponding to chloroform in its molecular structure is

Iodoform, Tri-iodo-methane (CHI_3), which has a decided power as a local anæsthetic and antiseptic. Regarding the solubility, the U. S. P. proportions are correct; its solubility in absolute alcohol is 1 in 30, although Allen gives 1 in 25.

Unguentum Iodoformi should be discarded, since CHI_3 is prescribed in variable proportions; but if the preparation should be retained, a solvent (ether) should be specified. The next in order would be the hydroxyl substitution products. The first of these is

Methyl Alcohol (CH_3OH).—Its incorporation in the Pharmacopœia is in all probability for the purpose of denaturalization of ethyl alcohol, an object which should not be approved by the Committee. If intended as a solvent for organic principles, a preparation of exceptional purity will be required.

Acetic Acid.—Methyl carboxyl. A process for its preparation should be given. The source being definitely stated, probable impurities can be guarded against.

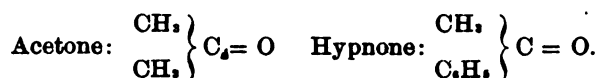
Empyreumatic bodies should especially be noticed. Squibb's test by means of permanganate of potassium is very good. The bisulphide-of-carbon test for water usually produces a turbidity with glacial acetic acid.

Pix Liquida and **Oleum Picis Liquidæ** should conform with each other; the source should be the same.

Creosotum.—Medical experience has proven the virtue of the preparation to be dependent upon the proportion of guaiacol. Beechwood tar furnishes the best preparation; this should then be its source.

Acetone is deserving of as much recognition as bisulphide of carbon or methyl alcohol. Its application in the manufacture of chloroform will necessitate a description of its chemical and physical properties. It is a solvent par excellence for most resins, gums, and guncotton.

Hypnone.—Although it does not strictly belong to the methane series, yet its structural formula would indicate acetone, in which the radical phenyl (C_6H_5) is substituted for one of the methyl groups:



It was introduced by Dujardin-Beaumetz. Possesses strong hypnotic properties. For physical and chemical properties see "Die neueren Arzneimittel" (by Dr. B. Fischer).

Alcohol.—Ethyl alcohol; Ethyl hydrate ($\text{C}_2\text{H}_5\text{OH}$). The density of alcohol has been determined by many, whose results differ, owing to the difficulty of removing the last trace of water. In estimating the percentage of alcohol contained in alcoholic solutions, it has been the writer's experience that a variation of 0.5°C . in temperature would produce a variation of 3 to 5 per cent in strength. A reference to Dr. E. R. Squibb's labors will show that it is utterly impracticable to insist upon definite, non-varying specific gravities and strengths. The method of the German Pharmacopœia, which allows a certain latitude, will meet with approval.

Squibb is correct in his statements as to tests for water. E. W. Davy detects 0.1 per cent of alcohol in water by adding a few drops of the liquid to a solution of molybdic acid in H_2SO_4 . Application of the principle gave negative results.

Ethyl Iodide ($\text{C}_2\text{H}_5\text{I}$) has of late again come into use, and is perhaps worthy of consideration.

Ether.—Ethyl oxide ($\text{C}_2\text{H}_5\text{O}$). The method of the German Pharmacopœia should be pursued—a minimum and maximum spec. grav. with corresponding percentage by weight. In importance it is equal to chloroform, and should meet with the same precautionary measures.

Spiritus Ætheris.—Discard.

Spiritus Ætheris Compositus.—It will be necessary to arrive at some definite method indicating the presence of heavy oil of wine, provided it can be shown to possess medicinal virtues, otherwise discard the preparation and retain the former.

Paraldehyde, a powerful and reliable hypnotic, a polymeric modification of aldehyde. For physical and chemical properties, see "Die neueren Arzneimittel" (by Fischer).

Chloral substitution products of aldehyde:

Chloral Hydrate, erroneously called chloral. It is the hydrate of trichloraldehyde ($\text{CCl}_3\text{CH}(\text{OH})_2$). The U. S. P. tests are very good. Should the iodoform test for alcoholate be positive, it would be desirable to have a quantitative test for chloral. See Allen's "Organic Analysis" (i., 172).

Butyl Chloral Hydrate, formerly known as croton chloral. I doubt whether the preparation will meet with favor with the medical profession. It is but little soluble in water; a suitable menstruum would be desired.

Acetic Ether.—Ethyl acetate ($\text{CH}_3\text{COOC}_2\text{H}_5$). According to Allen, "the solubility of water in acetic ether is 1 measure in 26 at 0° , and 1 in 24 at 15°C ." The color of litmus paper changes upon the volatilization of the ether.

Spiritus Ætheris Nitrosi.—So much has been written on this subject that nothing remains to be said.

Sulpho-Substitutions.—Similar in structure to the alcohols are the mercaptans, but instead of being hydrates they are sulphhydrates of the radicals, ordinary mercaptan being ethyl sulphhydrate. Mercaptal is produced by the action of acetone on mercaptan, and this in turn is further oxidized by permanganate of potassium to form **sulfonal**, the medical properties of which are those of a hypnotic.

Ethyl Urethane.—This compound is closely related to carbonic acid, the hydroxyl being replaced by amidogen, and the H of the second hydroxyl group is replaced by

the ethyl hydrocarbon radical, $\begin{array}{c} \text{NH}_2 \\ \text{C}_2\text{H}_5\text{O} \end{array} \left\{ \text{C} = \text{O} \right.$. It is a powerful hypnotic. See "Die neueren Arzneimittel."

Estimation of Sugar by Fehling's Solution.—H. Causse suggests the addition of 4 C.c. of a 5-per-cent solution of potassium ferrocyanide and 20 C.c. of water to each 10 C.c. of Fehling's solution employed. On running in the sugar solution to the boiling mixture, the potassium ferrocyanide dissolves the cuprous oxide as quickly as it is precipitated, and forms a colorless solution, thus rendering the exact point of decolorization more easily seen and preventing bumping.

Potassium ferrocyanide appears to be without action on hot or cold Fehling's solution. On cooling the liquid obtained after titration, it turns brown and deposits colorless crystals, which the author intends to study.—*Bull. Soc. Chim. and Jour. Chem. Soc.*

Euonymus and its Proper Menstruum.

FROM a paper contained in the *Pharm. Journ.* (December 14th), "on the root bark of euonymus and euonymin," by Messrs. Naylor and Chaplin, we derive the information that the active principles of euonymus are best extracted by a menstruum containing not less than 65 per cent of alcohol. The authors found that even hot water failed to extract from the bark any principle having a laxative or hepatic effect. Alcohol of 65 per cent yielded an extract having these effects in a decisive degree; and still better results were obtained by preparing an extract with alcohol of 84 per cent.

The authors recommend that the fluid extract of euonymus should be made with a menstruum prepared by mixing 4 vols. of rectified spirit (spec. grav. 0.838, Brit. Pharm.) and 1 vol. of water. [The U. S. Pharm. has a formula for an extract of a pilular consistence only, which is directed to be prepared by exhausting euonymus with diluted alcohol. It will be necessary to change this menstruum in accordance with the above quoted results.—ED. AM. DRUGG.]

In the preparation of the so-called "euonymin," the authors also recommend that the powdered bark should first be exhausted with water, then dried, and afterwards extracted with alcohol not below 65 per cent. The final product obtained after distilling off the spirit and drying the residue, when mixed with an equal weight of sugar of milk, will be found to contain enough of the brown resin to be easily reduced to powder. The dose of this will be from $\frac{1}{4}$ to 2 grains.

Scopola Carniolica.

AT a meeting of the Pharmaceutical Society held in December several papers were presented relating to the use of *Scopola carniolica* as a proposed substitute for belladonna. Prof. W. R. Dunstan, speaking of the rhizome, said it came principally from Austro-Hungary, that it is cheaper than belladonna, and that the supply is practically inexhaustible. Two species were known and had been examined: *S. japonica*, which had been investigated by Eykman, and is said to yield the alkaloid scopoleine—almost identical with atropine; and *S. Hladnikiana*, a rare exotic, said by Schmidt to also contain an alkaloid. Chemical examination readily detected an alkaloid, but the separation of each constituent involved the expenditure of much time, it being thought that more than one mydriatic alkaloid was present. Hyoscyamine had been separated and identified, and it was claimed that a new and important source of that alkaloid had been discovered.

Prof. Dunstan and A. E. Chaston stated that scopoleine, instead of being a new alkaloid, as claimed by Prof. Eykman, approximated to a mixture of atropine, hyoscyamine, and hyoscyne. A fluorescent material, and a fatty body said to be cholesterin, had also been isolated by Eykman. Prof. Schmidt had recognized hyoscyamine in *S. Hladnikiana*. Dunstan and Chaston had examined *S. carniolica* in carefully selected specimens which had been air-dried, powdered finely, and extracted with cold alcohol, and the percolate evaporated between 30° and 40° C. To extract the fat, the semifluid mass was shaken with acidulated water and alcohol, and the chloroform solution separated, evaporated, and examined. The acidulated water containing the alkaloid was treated with a slight excess of ammonia and extracted with chloroform. Evaporation of the chloroform yielded an impure, highly colored alkaloid. This was purified by solution in dilute acid, adding ammonia and extracting with ether. The amorphous residue, after treatment with anhydrous ether and repeated recrystallization, yielded crystals of great purity. The melting point of these crystals was—for the first fractionated crystals, a m. p. of 108.4°; the second fraction had a m. p. of 107.7°, and a further, one of 106.9° C. These crystals possessed all the properties of hyoscyamine.

Mr. F. W. Ransom reported upon the pharmacy of *Scopola carniolica*. Twenty-five Gm. of powdered rhizome were percolated with a mixture of equal parts of absolute alcohol and chloroform, continuing with hot percolation. After washing the precipitate with dilute acid and then with chloroform, the aqueous solution was rendered alkaline with ammonia, extracted with chloroform, and the chloroform evaporated. By this means was obtained 0.134 Gm. of residue, or 0.54 per cent. When dried at 212° F., it lost 25 per cent of weight and equalled 0.43 per cent. These results were slightly higher in alkaloidal value than were obtained from three samples of belladonna root. The experiments to determine the preferable menstruum favored a mixture of 4 parts of rectified spirit with 1 part of water. A solid extract made by using only rectified spirit for extraction and a liquid extract of standardized strength, would enable a tincture to be made by mere dilution with spirit; or a liniment, with spirit and camphor; or an ointment, by mixing 1 part of the solid extract with 9 parts of benzoated lard.

Dr. Dyer Duckworth found that a half-grain of extract of scopola would check night-sweating, and that the extract acted as an anodyne when externally applied. Its general action resembled that of belladonna.

Mr. E. M. Holmes stated that the plant is native in

southeast Germany and throughout the whole of Austro-Hungary; is very similar to belladonna in leaf and flower, but grows only to a height of one to two feet. The principal distinction between belladonna and scopola is that the former has a root stock and black, indehiscent fruit, while scopola has a rhizome and a fruit that dehisces transversely, like henbane. The leaf is more reticulated than that of belladonna, and has a more glistening exterior. It grows in damp woods on a calcareous soil. The rhizome contains cells with raphides, similar to belladonna, but quite unlike henbane.—Br. and Col. Drugg.

Commercial Oil of Cinnamon.

MR. FRANK E. BALLARD, manager for Messrs. A. Moore & Co., of Smyrna, sends the following interesting note on the commercial tests for oil of cinnamon to the *Chem. and Drugg.* (December 28th):

While living in Ceylon, it was often my duty to examine and report upon various samples of the cinnamon oil of commerce, and to write certificates as to its specific gravity, it being the custom for Colombo merchants to send a sample of the article to a chemist for examination before accepting a consignment from the native producer, or giving an advance upon it pending its transmission to and sale in a European market.

This special work was quite new to me, so I began reading up the subject as far as possible, and at the outset found some little difficulty, by reason of the variations in specific gravity given by the various authors I consulted, no two of them being alike. Books failing me, I began questioning the buyers I met as to the means they adopted.

A gentleman told me he tested his samples by allowing single drops of the oil to fall into a glass beaker of water, and judged by the relative rapidity or slowness with which they reached the bottom as to their freedom from adulteration, the deduction being that the lighter the oil the slower it travelled, and *vice versa*. Rather a risky and unsatisfactory operation, anyhow! Another buyer staked his money on his taste, and defined a good oil as one which tasted very sweet in the mouth, and left no hot, peppery after-flavor. This test, I afterwards found, had a certain amount of value. The specific gravities given in the books I consulted varied between 1.026 and 1.035, which leaves a very wide margin of doubt and uncertainty when applied to such a product as cinnamon oil.

I next tried to get a guaranteed specimen of pure quill oil as a standard. This was unobtainable, no merchant being able to state from what part of the plant any oil he had had been distilled. It would not have done to depend upon a native specimen, so I was under the necessity of distilling it myself. This was done, and by careful collection I got $\frac{1}{4}$ oz. of oil from 12 $\frac{1}{2}$ lbs. of bark, all quill.

But such an oil! Beautiful to see, delicious to smell, and as different from the native product as creosote is different from crystal carbolic acid. It was of a bright pale golden color, sweet taste, rapidly diffused, and leaving no bitterness on the tongue. Its spec. grav. was 1.019.

Now, whence came such abnormal spec. grav. as 1.026 and 1.035 I shall be able to show. On inquiry from distillers I found that they can produce, practically, as many grades of oil as they please at specific gravities between 1.019 and 1.045. The finest and lightest oil is the product of quill bark alone, and will not vary in spec. grav. more than between 1.019 and 1.021. A second quality is produced from chips, root bark, broken quill, and the cinnamon *débris* of the factory generally. The spec. grav. of this oil will vary between 1.025 and 1.032. A third oil is distilled from the leaves alone, and is very different in its characters from the other varieties. It is light brown in color, and sweetish, but it leaves an acrid, burning taste on the tongue, and its odor is rough, and when smelled after a fine quill oil it is decidedly unpleasant. Its spec. grav. varies, but, as a rule, will be from 1.040 to 1.045.

With these data it is easy to understand the errors in description of specific gravities given by various writers on materia medica and pharmaceutical chemistry. They never had a pure sample of oil for examination, but simply the common market variety, which is never—so far as I could learn from native distillers—prepared from quill bark alone, but is, as a rule, a mixture of the varieties named, in varying proportions. It would not pay them to send home a first-class oil, for the highest prices paid seldom pass 1s. 10d. per ounce, and frequently an ordinary oil has been left unsold at 6d. or 8d. Consequently they send the bark to Europe, and make their oil from the refuse, and hence the spec. grav. is given in the United States Pharmacopœia as 1.040, and in Muter as 1.035; while MM. Salet, Girard, and Pabst, in the *Agenda du Chimiste*, give 1.033, and Hager 1.005 to 1.030. The British Pharmacopœia gives the *coup de grâce*, and tells us with the most charming naïveté that "it sinks in water." What a lucid definition!

Cod-liver Oil saponified with an equal amount of lime water, and flavored with essence of vanilla or citron, is said to form a syrupy liquid free from the natural odor of the oil.

PRESCRIPTION FILING.

WRITING to the *Pharmaceutical Record* of January 6th, Mr. Joseph T. Estes, of Rockland, Mass., says, respecting the methods of filing prescriptions: For one I say, paste them in a book, by all means, and always keep the original, if possible, giving a copy to the customer if he asks for his prescription. I filled eleven books by copying, but gave it up long ago—life is too short and busy to waste in this way. If there is a supposed error you have no proof in your copy, but if you have the original to refer to all is well. I am now on my seventh book filled by pasting. The book used is substantially bound and is 10½ x 20 inches, ¾ inches thick (inside measurement), and holds between 7,000 and 8,000 prescriptions. The leaves are strong manilla paper. I always keep two books on the prescription case, the one last filled and the one being filled. It takes no more room, and raises the one most in use, so that it is much easier to read the not always plain writing. I keep the book open by a brass rod with an eye which is screwed to the edge of a shelf, and which when dropped is long enough to hold the leaves in place, and which when not wanted is hooked up out of the way. The books are bound in the usual style, but in use are in the position shown in the illustration. In pasting I begin at the left-hand upper corner and follow down both pages. In this way reference is easier, and it gives four columns of prescriptions to the page.



Estes' Prescription File.

DESSAU'S POWDER DIVIDER.

MR. W. F. DESSAU is the inventor of a machine described in the *Western Druggist* as capable of securing the accurate division of powders to the number of 48, and from ¼ to 30 grains in size.

A represents a V-shaped trough or receptacle for powder, graduated and numbered on top from 1 at closed end to 48 at open end. B shows forty-eight V-shaped blades which fit perfectly into A, each blade corresponding to a graduation on A. C is a lever and clamp which fastens and holds B to A when in use. D is a sliding, V-shaped partition, fitting perfectly into A. E is a swinging end gate to A. F is a spring and lever which moves B forward one notch when B is placed in A. The entire machine is made of steel, nickel-plated, and is very durable.

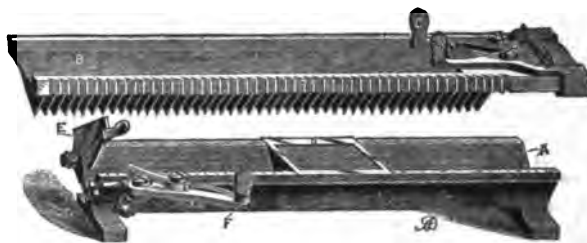
Directions for making fifteen powders: Close end gate E; slide D to No. 15; place powder in A between E and D; level powder perfectly by tapping A on counter or with end of spatula; now place D into A, pressing blades through powder, which is then divided. Spread fifteen powder papers on counter; hold divider in left hand with end E over paper, and open E, which permits B to move forward and drop first powder on paper by pressing lever F once. Pass on to each paper, pressing lever once over each one, when powder drops out. The powders are then folded.

ANOTHER powder-divider, invented by W. J. Hull and described in the *Western Druggist*, acts in much the same manner, with the difference that the dividing blades are radial instead of parallel. Fig. A represents the revolving cogged plate or ratchet-wheel, with twenty-four equidistant blades which closely fit the receptacle and serve to divide the powder and, as the plate is revolved, bring each portion of the powder to the discharging place. Fig. B shows the receptacle or tray (1), the subdivider (2) with the indicator (3) and the ratchet (4). The subdivider being removed from the central pivot, the powder is placed in the tray and easily distributed over the trough. The divider A is then dropped into place, separating the powder into even portions; the discharge gate being then opened, and the wheel turned the distance of one ratchet for each powder to be discharged. When less

than twenty-four powders are required, the subdivider is first put in place, and with the aid of the movable and the fixed diaphragms the number of powders to be formed are regulated.

East Indian Gums.

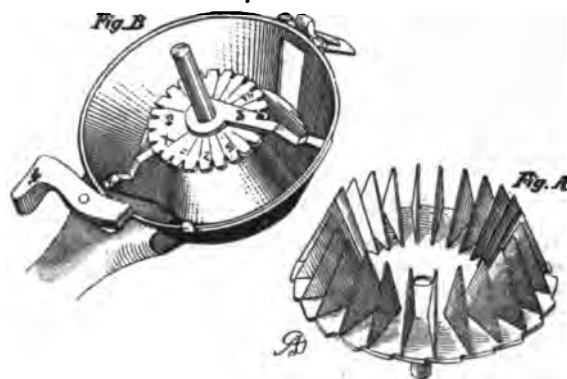
MR. J. H. MAIDEN, of the Technological Museum of Sydney, New South Wales, has recently issued a communication on the "Similarities and Dissimilarities of Sterculia Gum to Tragacanth," from the report of which, in the *Chemist and Druggist*, we extract the following: Gums produced by totally different plants, such as *Cochlospermum Gossypium* and *Sterculia urens*, though similar in appearance, are so nearly alike that it is difficult to separate them when mixed. This illustrates the importance of specimens of the plants themselves for



Dessau's Powder Divider.

those who have charge of collections of gums, resins, and similar products, as means for their identification.

In connection with this subject, and bearing some relation to that taken up by Mr. Maiden, we may refer to some few gums of Indian origin that bear some resemblance in substance, though not in appearance, to the tragacanth-like series. Thus, under the name of "Mochras," or "Mocherus," several dark-colored but transparent gums are known in India; that generally going by this name, however, is usually ascribed to *Bombax malabaricum*, a large tree belonging to the tribe Bombaceæ of the natural order Malvaceæ. It seems that no amount of tapping or notching, or even cutting deeply into the bark or sapwood, will produce the smallest exudation of any gum or mucilage; but when the bark is diseased a sort of jelly flows abundantly in spring as the sap rises. From observations made in India of a large living bombax tree, a part of the trunk of which was swollen from disease and the bark split and decayed, a yellowish, jelly-like substance had exuded from all the wounds, described as



Hull's Powder Divider.

being "sometimes like a mere tube of paint squeezed out of an oil-color tube, and at others forming a mass of the size of a large tomato." On exposure to the air the outside of this mass soon hardens, after turning brown, and the whole mass then dries up and collapses, or rather shrivels into an irregular, wrinkled, and hollowed lump, of a dull brown color and brittle but somewhat mucilaginous if softened in the mouth. Fresh "mocherus" from this tree, when put in either hot or cold water, was found to soften and swell and to disintegrate, though it was not absolutely soluble. Upon chemical examination it was found to contain a certain, though not a large, amount of a modification of tannic acid and a red coloring matter, which was destroyed by acid and restored by alkali. The drug is used in India as an astringent and for various mucous derangements, in menorrhagia, and as a styptic.

A very similar or identical gum is said to be derived, in some parts of India, from the areca or betel palm (*Areca Catechu*), while in Lahore "Mocherus" is declared to be produced by the Sohájna tree (*Moringa pterygosperma*), a leguminous tree 30 feet to 35 feet high, and known to Europeans as the horseradish tree, in consequence of the root having a pungent taste and being used as a substitute for that condiment. The gum from this tree, though its exterior appearance is not very dissimilar to that just described, shows upon fracture a dark rose color with a very waxy appearance. It varies, however, "in color from a red to a semi-opaque pink to almost white"; and

in form from irregularly-rounded tears to longish stalactitic pieces. Though hard and brittle, it softens and swells in the mouth; and placed in water forms a firm jelly. The gum which most nearly approaches this is that produced by *Eriodendron anfractuosum*, a widely distributed Indian tree growing some 50 feet or 60 feet high, closely allied to *Bombax malabaricum*, and sometimes known as the cotton tree, in consequence of the fruit being filled with a mass of silky cotton in which the seeds are embedded. It has been stated that gum kuteera, which is now referred to species of *Sterculia*, is the product of *Eriodendron*; but this would seem to be a mistake. Anyhow, the gum received from India as the produce of *E. anfractuosum* is of a dark reddish color, transparent, and swelling in the mouth in the same way as the gum of *Moringa*.

From *Stereospermum chelonoides*, a tree found throughout the moister parts of India, and belonging to the natural order Bignoniaceæ, a red-colored gum exudes not unlike those previously referred to. It is, however, of a brighter fracture. Little seems to be known about it. Another deep red gum, externally very dark and opaque and only partially soluble in water, is said to be furnished by *Ailanthus malabarica*. It occurs in rather large, roundish tears, and is said to be sometimes used in India as a remedy in dyspepsia. Dymock says: "It yields a fragrant resin known as Muttee pal on the Annamallays, which may become valuable as an article of trade. Reduced to powder, mixed with milk, and strained, this resin is given in small doses in dysentery and bronchitis, and is reputed to be an excellent remedy, owing to its balsamic properties." Mr. Broughton, some time Government Quinologist, describes it as dark brown or gray, plastic, opaque, and with an agreeable smell. It is often very impure; but the pure resin is soft, of the consistence of thick treacle. When burnt, it gives off a fragrance, and hence it is sometimes used for incense. The perfume is, however, inferior to those resins usually used for this purpose. The tree belongs to the natural order Simarubaceæ.

Drury, in his "Useful Plants of India," states that *Macaranga indica*, a euphorbiaceous tree very common in Travancore, exudes a gum resin from the cut branches and base of the petioles. He describes it of a light crimson color, and says that it "has been used for taking impressions of leaves, coins, medallions, etc. When the gum is pure and carefully prepared, the impressions are as sharp as those of sulphur, without its brittleness. Powdered and made into paste, it is reckoned a good external application in venereal sores."

It will be seen from the foregoing remarks that trees of very distinct natural orders are credited with furnishing gums of very similar characters. Much confusion, however, no doubt exists as to the accurate identification of the sources of some of these gums, and this is but one question out of many connected with vegetable products that requires to be thoroughly worked out by some qualified person or persons resident in the districts where the plants grow.

Antipyrine and Iodine.

M. MANSEAU finds that antipyrine combines with a definite proportion of iodine, and bases thereon a method by means of which the purity and identity of antipyrine may be [?] determined.

One gramme of antipyrine is dissolved in 100 C.c. of water. To the solution are added about 10 C.c. of starch solution (1 in 100). The liquid is heated to 40°-42° C., and next there is added, drop by drop, and under constant stirring, a solution of iodine containing 14.39 Gm. to the liter, until there is a persistent blue tint. According to the author, if the antipyrine is pure, 6 C.c. of the iodine solution will be consumed, which corresponds to 0.08634 Gm. of iodine.

The author has met with antipyrine of "foreign origin" [apparently that made at the home factory in Germany, since there is no other one to our knowledge] which was less handsome than the one above reported on, and which absorbed only 0.07241 Gm. of iodine.—After *Rep. de Pharm.*, 1889, 298.

[It is not clear to us what sort of a compound iodine can form under these circumstances. Supposing that antipyrine, $C_{11}H_{11}N_2O_3$, could form substitution compounds with iodine, the lowest member of the series would be $C_{11}H_{11}IN_2O_3$. As antipyrine has the molecular weight 188, the moniodo-antipyrine would have the mol. w. 314 and contain 40.4 per cent of iodine. According to Manseau, however, 100 Gm. of antipyrine would appear to combine only with 8.634 Gm. of iodine. This would be almost equivalent to a proportion of 8 molecules of antipyrine to 1 atom of iodine. We doubt very much whether this method of testing antipyrine is of practical utility.—ED. AM. DRUGG.]

Chloral Hydrate in solution of 5 grains to the ounce of water is said to be an efficient application to the scalp for the relief of dandruff, and the loss of hair which commonly attends it.

Antipyrine Incompatibility.

MR. CHABROL describes the difficulty met with in dispensing powders containing each 0.10 Gm. of β -naphthol and antipyrine, and 0.25 Gm. of salicylate of bismuth. In whatever order the substances were mixed, the product was a liquid paste. The difficulty was overcome by mixing the antipyrine with five times its weight of sugar, and then adding the naphthol and bismuth salicylate. The trouble seems to be due to the incompatibility of the first two rather than to the antipyrine and bismuth salicylate.—*Pharm. Journ.*

Sales of Drugs by Auction.

PERIODICAL drug auctions have been held in London for generations, and there is not at present any prospect of their discontinuance, though occasionally voices are heard in advocacy of their less frequent occurrence. We should be disposed to think that no small part of the pre-eminence of our port as a centre for the drug trade is due to these auctions, and that the publicity which attends all transactions at the sales is of immeasurable service in attracting shipments of drugs from all parts of the world to London warehouses. The only other markets, so far as we are aware, where public auctions of drugs and goods of similar character are now held at fixed intervals, are Amsterdam and Rotterdam, and the transactions in these cities are confined to varnish gums and cinchona. But the extension of steamship communication, the striving of continental nations for colonial acquisitions, the extraordinary growth of the industrial importance of Germany and the United States, and a variety of other causes, have called into existence during the last twenty years a number of drug markets of some importance where there is a disposition to look upon London with some jealousy. These markets are still forced to follow our lead, and probably will continue to do so for many years; and both New York and Hamburg, our principal competitors, are at the same time our best customers for raw drugs. But as the great continental states grow in commercial importance, and their inhabitants advance in purchasing power, we must be prepared to see them gradually emancipate themselves from our leadership, and get ready for the time when we shall have to look upon them as competitors in the less developed markets of the world, rather than as customers of ours. To a large extent these conditions already prevail in manufactured goods, and presently the same will be the case with raw or partly manufactured articles, such as the drugs which pass through the London auctions.

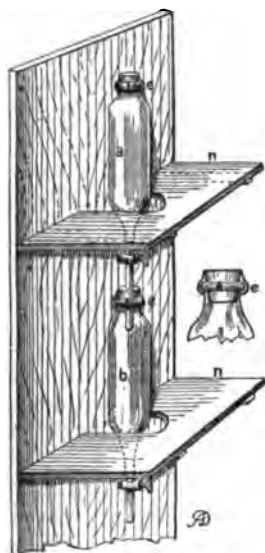
It is therefore a matter of surprise that no serious attempt should ever have been made to copy our drug auctions in such places as Hamburg, Havre, Marseilles, or New York. From time to time rumors have arisen that steps in this direction were about to be taken, but no definite results have followed. The fact that London is the only market where foreign shippers can put the actual value of goods to the reliable test of open competition explains, probably, why a large number of goods shipped from Chinese and Indian ports to Hamburg, by the new German mail routes, are regularly transhipped hither to be sold by public auction. But the first indication in this direction comes from neither Germany nor America. We understand that a determined attempt to establish public auctions for drugs is now about to be made in Paris. In that city there have been hitherto occasional drug sales under the auspices of three or four brokers and agents, some of whom were formerly rather intimately connected with the London market. But these auctions consisted generally of goods seized under judicial warrants, or which had otherwise to be disposed of, and not drug auctions in the London sense. We have at this moment before us a catalogue of such a "vente judiciaire" which took place at the Magasins du Château-d'Eau last Saturday, when about 11 tons of Senegal and Aden Arabic gums, 2 cases soap, 2 boxes aniline black, and a quantity of other goods were offered for sale. Another and larger sale of drugs, the stock of a firm whose business had been liquidated, took place a few days previously, and it is said that the excellent prices realized on that occasion have given a strong stimulus to the party who favors regular drug auctions on the London system. It is claimed by that party that public auctions would considerably curtail the charges on drugs now falling upon importers, who would then be able to dispense with private warehouses and sell goods direct from the docks or entrepôt. On the other hand, information we have collected from the wholesale trade in Paris shows that in their body, as distinguished from the brokers and certain agents, the public auction scheme does not meet with much enthusiasm. One firm gave it as their opinion that the plan would probably be successful if the Havre importers could be induced to support it; but on the whole it seems likely that the Parisian wholesalers are scarcely the people from whom much assistance can be expected.

Another imitation of British customs has, however, been recently adopted by the Parisian wholesale druggists. They now meet on 'Change three times a week, on Mondays, Wednesdays, and Fridays, from 2:30 to 3:30 P.M.,

at the new Bourse du Commerce in the Rue du Louvre, which is in close proximity to the centre of the drug quarter. This innovation is due to the efforts of the same brokers who are prominent in the public auction agitation, and we are informed that the wholesale trade have taken to this scheme with much more enthusiasm than they displayed toward its sister project, and that the majority are heartily supporting the Bourse meetings. That their customers will hail the scheme with satisfaction cannot be doubted by any one who has had experience of the inaccessibility of the Parisian wholesalers, and of their tendency to make their would-be purveyors cool their heels in an antechamber for hours in anticipation of being ushered into the presence of the principal.—*Chemist and Druggist*.

A NEW CONTINUOUS EXTRACTOR.

Most of the many apparatuses for making extracts are inapplicable when it is desired to make extracts of volatile substances, or of substances which would be decomposed by distillation or by warming. The annexed figure shows an arrangement by which the most concentrated extracts or tinctures of spices or perfumes, etc., can be made without evaporation. A number of cylindrical glass vessels, *a, b*, are placed on a suitable stand one above the other, so that the tube of one vessel passes through a cork fitted into the mouth of the vessel below. From six to twelve of these vessels may be used one above the other. The stand consists of a board with pairs of projecting pegs placed at such distances that there is room for the cylinders between them. Boards having a horse-



Ungerer's Continuous Extractor.

shoe-shaped piece cut out on one side are placed on these pegs, and serve to support the cylinders in their places. The material from which the extract is to be obtained is placed in these cylinders, a little asbestos or cotton-wool packing having been first inserted. The solvent is then allowed to run into the top cylinder, either freely or (in order to increase the pressure) through a long tube attached to the top. The liquid permeates the substance in the cylinder, and runs through into the cylinder below, and so on to the bottom, where it is drawn off as the strongest possible tincture. By adjusting the lowest stopcock, the speed of flow can be properly regulated. The number of vessels and the speed of percolating should be so regulated that the tincture begins to flow from the lowest cylinder just when the contents of the top one have been thoroughly exhausted. As soon as the top cylinder is exhausted it is removed, the whole column of vessels raised up a stage, and a newly-filled vessel is added at the bottom. In this way the process becomes continuous, and a concentrated extract can be made, except, of course, towards the end of the operation. When alcohol, ether, and similar solvents are used, the liquid remaining in the vessels at the end of the operation may be recovered by emptying the cylinders and distilling off the liquid from the spent material, or steam may be blown through the column from the top downward, when the spirit is driven out and may be collected below fairly well separated from the condensed water. Samples of the tincture may be taken at various stages by double boring the corks and attaching a tube with a stopcock, through which a portion of the extract may be drawn as required; or a three-way tap may be used with branch tube instead of the ordinary tap arrangement.—A. UNGERER in *Zeitsch. f. ang. Chem. and J. Soc. Ch. Ind.*

Iodoform Direct from Seaweed.

THERE has been started recently at Poterie-de-Belbeuf, Rouen, the manufacture of iodoform direct from the waters of lixiviation from varech. The clear desulphurized solution is thoroughly beaten with mechanical agitators after the addition of a certain proportion of caustic soda, and the iodides are transformed into iodoform by adding acetone and hypochlorite of soda. The iodoform which is precipitated is washed, dried, and crystallized from alcohol or other suitable liquid. It is maintained that the persistent and disagreeable odor of iodoform is due to the use of alcohol in its manufacture, iodine being liberated, and rendering possible the formation of iodized organic bodies as by-products which are of strong odor. Acetone-iodoform is made without the liberation of iodine, and can be produced in very dilute solutions, both conditions being highly favorable to the production of an absolute and inodorous iodoform.—*Chem. and Drugg.*

A SIMPLE SUBSTITUTE FOR KIPP'S APPARATUS.

THE accompanying sketch represents a simple contrivance for supplying a continuous and steady stream of carbonic acid. The flask, with a capacity of 500 to 600 C.c., contains hydrochloric acid. The bottle, fitted with a tap tube, contains chips of marble. They are connected by a tube in the form of a siphon reaching to the bottom of each. The flask is also provided with a tube similar to the shorter tube of a wash bottle, and for a similar service; it has been represented in its present position for convenience in drawing, but should be turned through 90° toward the reader for convenience in operation. When the evolution of gas is required, the tap tube is opened and the pressure within the flask increased just sufficiently to fill the siphon tube with acid.



Thompson's Substitute for Kipp's Apparatus.

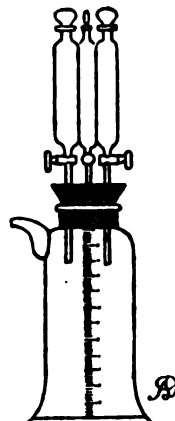
Directly acid enters the bottle, gas is evolved and more acid flows over. If it is desired to stop the evolution the tap tube is closed, and the pressure exerted by the gas confined in the bottle rapidly drives the acid into the flask again and empties the siphon. If a steady and continuous stream of gas is required, the opening of the tap tube can be regulated, with a little trouble, in such a manner that, when once the siphon tube has been filled with acid, only a small quantity will run into the bottle, because the pressure of the gas, being allowed only limited freedom in egress, is sufficient to prevent an excessive quantity of acid from flowing in. But, as the hydrochloric acid in the bottle becomes saturated with calcium chloride, its action becomes less vigorous, and the pressure of gas would be diminished but for the fact that additional acid, thus permitted to flow over very gradually, is just sufficient to keep it at the same height.

In the same apparatus, the marble may be replaced with zinc or with sulphide of iron for the preparation of hydrogen or of sulphuretted hydrogen respectively. It is, in fact, a simple substitute for Kipp's apparatus. One advantage, not altogether inconsiderable, which gives it a preference to the latter, is that it requires a far smaller quantity of acid; that which has not dissolved calcium, iron, or zinc chloride remaining in the flask till required, does not mix readily with the portion already saturated, and, when all is saturated, it is easily replaced by a fresh quantity.—EUSTACE THOMPSON, in *Chem. News*, November 8th, 1889.

A SIMPLE APPARATUS FOR GENERATING OXYGEN GAS.

C. F. GÖHRING recommends the below-described method and apparatus for preparing pure oxygen gas on a small scale.

A large flask with spout, of the shape shown in the cut, and graduated, is provided with a rubber stopper through which three stoppered funnels pass. The latter are filled, respectively, with concentrated water of ammonia, solution of permanganate of potassium (5 Gm. in 1 liter), and concentrated phosphoric acid. In order to afford to the eye a criterion to ascertain when the contents of the flask or reservoir are alkaline or acid, the ammonia may be tinted with phenolphthalein, or the phosphoric acid with methyl-orange. The flask or reservoir is filled about two-thirds full with peroxide of hydrogen solution.



To generate oxygen, ammonia is allowed to flow into the flask until the contents are rendered alkaline (and show the phenolphthalein tint, if this indicator has been used). Solution of permanganate is then allowed to flow in, in drops, when oxygen will at once be given off, which may be conducted by suitable tubing to where it is wanted. When the current is to be interrupted, enough phosphoric acid is allowed to run in to neutralize the ammonia and render the liquid acid. When the current is to be started again, the liquid need only be supersaturated with ammonia. Thus the current may be started and stopped until the peroxide is exhausted.

If the strength of the peroxide has once been determined by acting upon a measured quantity in the flask by the process here described, it will be easy to predetermine the quantity of peroxide to be used in order to obtain a certain quantity of oxygen.—After *Chem. Centralbl.*, 1889, 114 (from *Chem. Zeit.*)

The Licorice and Agrumi Industry in Sicily.

FROM a very interesting series of papers by Prof. F. A. Flückiger, containing sketches made during his Easter vacation in southern Italy, we select a few notes, after the *Archiv der Pharmacie* (December, 1889).

1. The Licorice Industry in Sicily.

Licorice (*Glycyrrhiza glabra*) grows wild or has run wild on moist ground in the plain of Catania, but not on volcanic ground. It certainly is not specially cultivated there. In the sheds and yards of the licorice factories very considerable supplies of the roots, or rather root branches (runners), are met with. Prof. Flückiger was given every facility to see the process of licorice manufacture in Via Molino a Vente. The operation is quite simple, and is conducted during the winter, between October and April. The roots are washed, cut, crushed upon a stone, then twice boiled with water in flat iron pans (caldaje) holding 250 liters (about 66 gallons), and subjected twice to pressure, the work at each pan, with the quantity mentioned, consuming about one day. The boiled root is transferred from the pans into basket-like receptacles (frantojo, sporta di pezzuola, made from chestnut shavings), where they are pressed. A more perfect arrangement (called gabbia) consists of a wooden framework into which fit eighteen perforated iron plates (lastre di ferro), between which the roots are placed. The expressed juice is clarified by merely allowing it to stand. The last portions are poured upon a fresh lot of roots. The same pans (caldaje) are also used for inspissating the juice, heat being applied at first by means of coal, and afterwards by charcoal. Each pan yields about 400 kilos of "pasta," which is immediately cut up by females upon an oiled table made of walnut wood. The mass is either formed into blocks (pani or blocchi) weighing 5 kilos, which are wrapped in blue paper and of which 20 are packed into a case (cassa); or the mass is formed, by the aid of gutter-like forms made of marble or brass, into sticks (bille) of equal size, which are stamped, and then rapidly washed in order to remove the oil with which the sticks have become coated during the rolling. The final drying is accomplished in hurdles (tavole) in the store rooms, by exposure to the summer temperature. No artificial heat is used for drying. There is no chance of the licorice coming into contact with copper during the boiling [as has been asserted; or as has been shown to be present in certain other kinds of licorice. See, for instance, *Pharmacographia*, page 186.—ED. AM. DRUGG.]

2. The Agrumi (Products of the Citrus Family).

There is scarcely any locality where the "agrumi" are cultivated on a larger scale than in the coast district between Catania and Messina [east coast of Sicily]. Lemons occupy the first rank; next comes the sweet orange (portogallo or arancio dolce), the bitter orange (arancio amaro, the "bigarade" of the French); and lastly the citron (cedro), which is only used for making preserves. A similar use is made of the so-called limoncelli or piretti, which contain only a small quantity of a scarcely sour juice.

Another member of the Citrus family, the bergamot, is cultivated on the other side of the Straits of Messina, at Reggio. The most detailed account of agrumi is contained in the extensive work of Professor Penzig, of Genoa: "Studi botanici sugli Agrumi e sulle Pianta affini. Roma, Annuario di Agricoltura, 1887."*

Lemons grow in such immense quantity that their manipulation and export constitute one of the chief industries of Messina.

The handsomest fruits are carefully picked out, separately wrapped in fine paper, and packed by females into boxes holding three hundred to four hundred each. They are shipped to all parts of the world, though the export to the United States has decreased, owing to the increasing competition of Florida and California. Inferior lemons (scarti) are packed in tuns with salt water (salmaja [salamoia]). Large numbers of these may be seen in the harbor, being destined for northern countries, where these lemons are used for culinary purposes.

By far the largest proportion of lemons is consumed in the preparation of oil of lemon and citric acid. The ethereal oil is contained in the outer rind of the fruit, in cells which merely want to be punctured or torn to yield their odorous contents. Though the regular period of manufacture was over at the time when Prof. Flückiger visited the locality, the operation was practically performed for his special benefit by the courtesy of the firm Gaetano Alessi fù Giuseppe. The process employed is the very simple one, "alla spugna" (the sponge process). The workman cuts the lemon into quarters, removes the acid flesh, and presses the rind against a sponge which he holds in his right hand. The oil cells are thereby ruptured and yield their oil to the sponge, which is pressed with the hand when it has become saturated with oil. Owing to the unavoidable contamination with aqueous juice the oil is at first turbid, but soon separates, and may be poured off

perfectly clear. During the best season (October, November), 3,000 lemons yield at most 1 kilo of essential oil, which differs slightly in quality according to the varieties of fruit, the time of collection, etc.; but the differences are only recognizable by experts. The sponges used are medium-sized "horse sponges." After having been used for about ten days they become useless (spugna consumata), owing to brittleness and inability to take up oil.

So far as the quality of the oil is concerned, the sponge process leaves hardly anything to be desired, since the oil possesses the full aroma of the fruits. It is, however, clear that a considerable portion of the oil fails to be extracted by it, and various attempts have been made to introduce better methods for a more complete exhaustion of the lemons. Up to the present, however, these attempts have failed to do away with the old time process. Labor is cheap and lemons are so abundant that there appears no necessity of trying to extract the oil to the last drop, particularly if the manufacturer owns large plantations himself. For this reason also it is not very likely that lemon oil is adulterated, though there are said to be a few fraudulent manufacturers.

In the case of the bergamot the conditions are different. This fruit, which mostly remains green, and which is cultivated in quantity probably only near Reggio, on the mainland of Italy, opposite Messina, differs from the lemon in being globular and without a nipple. For this reason the sponge process is no longer used at Reggio, but the fruit is rolled over copper points which are fixed, comb-like, in a revolvable wooden cylinder. [Prof. Flückiger refers here to his *Pharmaceutische Chemie*, ii., 405, where a somewhat different apparatus is described. It consists of a strong tinned-iron basin, the bottom of which is bent strongly upward in the middle, and the interior of which is provided with sharp ridges. It is fitted with a very heavy lid, likewise sharply ribbed, which is set in rapid circular motion by a toothed wheel. About six to eight bergamots are introduced into the apparatus, and the rotation of the lid whirls these about, tearing the oil cells. The oil runs off through small holes situated in the bottom of the basin, and is caught by a cylindrical vessel into which the apparatus is fitted.] This process is much cleaner and extracts the oil more completely, which is of some importance, as the bergamot is not cultivated so abundantly. The oval and irregular shape of the lemons makes this process impracticable for the latter.

In the case of the oils of the Citrus family a special constituent, as bearer of the aroma, is less easily separable than in many other oils where the aroma may be materially improved by the removal of certain more volatile hydrocarbons possessing a less fine odor (as, for instance, in oil of caraway, anise, etc.). Although this operation may be applied to some extent to the oils of the "agrumi," yet most of the oil of lemon and bergamot is put on the market in its natural condition without being subjected to distillation. In Messina and Reggio, where by far the largest quantities of these oils are manufactured (much more than 100,000 kilos of both annually), nobody even thinks of distillation. This would only come into play where such products as the oil of orange flowers, oil of neroli, are to be obtained. No other process but distillation would answer for this purpose.

The separated pulp of the lemons, as well as the fleshy parts of the bergamots, are used for preparing citric acid. The lemon contains a larger quantity of this than the bergamot, which yields about one-fourth less. The juice is expressed from the flesh in basket-like receptacles (sporte di giunco, made from a species of Juncus, perhaps obtusiflorus or silvaticus?). These same baskets, which are made in Messina, are also exported to Toscana and the Riviera for pressing olives, and are used elsewhere in Italy for similar purposes.

To obtain 1 liter of juice more than 30 lemons are required. The largest proportion of citric acid (at most 10 per cent) is obtained from fruits gathered from December to February.

The expressed juice (agro) is slowly concentrated in an iron pan (caldaja) holding about 6 hectoliters (158.5 gallons), the density being determined by means of a so-called "citrometer" imported from Manchester. It is to this city, or at all events to England, that the largest proportion of the concentrated juice (agro concentrata) is exported. Fresh lemon juice shows 7° by the citrometer; after concentration it shows 60°, corresponding to a specific gravity of 1.233 to 1.235. Large invoices of the concentrated juice are regularly assayed both at Messina and in London to determine the actual proportion of citric acid. It is usually assumed that 1 gallon (imperial measure), or 4.543 liters, of concentrated lemon juice contains 64 oz. avoirdupois (28.349 Gm.) of free citric acid, and 1 gallon of concentrated bergamot juice 48 oz. Purchases are made upon the basis of the analysis, since the manufacturer may sometimes obtain a juice yielding over 65 oz. The amount of concentrated juice exported from Messina in 1888 amounted to nearly 2,500,000 kilos.

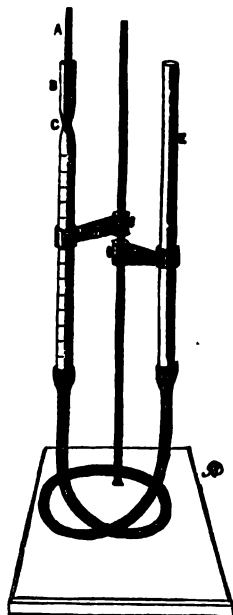
For the preparation of citric acid from the juice, calcium carbonate and sulphuric acid are required [both of which are amply available in Sicily]. It would be more natural for Sicily to export crystallized citric acid instead of lemon juice.

* Another useful work on the same subject, though less extensive, is the following: "Precetti sulla Coltivazione degli Agrumi del Prof. Ferdinando Alfonso Spagna. 8vo, Palermo, 1869." This work afterwards appeared in a revised and enlarged edition under the title: "Trattato sulla Coltivazione degli Agrumi del Prof. Ferdinando Alfonso. 8vo, Palermo, 1875."—ED. AM. DRUGG.

A SIMPLE APPARATUS FOR TESTING SPIRIT OF NITROUS ETHER.

THE well-known gasometric methods of estimating Spiritus Ætheris Nitrosi are not generally resorted to by provincial pharmacists, owing to the fact, no doubt, that nitrometers, as a rule, find no place in their apparatus. And the process lately devised by Professor Dunstan and Mr. T. S. Dymond, though admirably simple and accurate, is hardly more practical, since the average pharmacist does not possess a burette.

Now, with a little manipulative skill, an efficient apparatus may easily be constructed as follows: Take two straight pieces of glass tubing, having $\frac{1}{4}$ inch bore and say 20 inches long. About 3 inches from the end, one of the tubes should be drawn out (by holding in a Bunsen flame) to the thickness of $\frac{1}{4}$ inch. This we will call the neck (c). Next draw out to a point a piece of narrow glass tubing, and make the point air-tight by fusing in a flame; while the point is moderately hot, insert it in a



small piece of ordinary black (feeder) tubing (if done carefully it will adhere firmly). When cold, wet it, and insert it in the neck with a sharp three-cornered file, to indicate the proper position of the plug when working it. The tube has now to be graduated: drachms will be found most suitable for this size tubing. Hold the tube upside down and pour into it a carefully measured drachm of water, and, while taking care to hold the tube perpendicularly, scratch a mark with the file; introduce another drachm, mark as before, and so proceed to the end. The cup (B) can also be graduated, though using a measure direct saves time and trouble. The tube is now complete, and has only to be attached to the other tube by a piece of india-rubber tubing (say about three feet long), and fixed to a heavy retort stand by means of two clamps. To use the apparatus, raise the limb (E) about 6 inches, then pour in and fill up to the neck with strong brine,

carefully insert the plug so as to exclude any air, then depress the limb (E) about 12 inches. Pour into the cup a carefully measured drachm of the sample to be tested; gently raise the plug with a spiral movement, and when all but two or three drops have run in, close the aperture, add a few drops of water, and gently run in all but one or two drops. Next gently introduce a drachm of strong solution of potassium iodide (say 10 or 12 per cent), and then let in slowly a drachm of dilute sulphuric acid. Carefully place the plug in its proper position, agitate briskly at intervals, and after five minutes or so adjust the liquid in the two limbs to the same level and note volume of gas produced. This is well known as Allen's process; and the above apparatus was devised with the idea that the chemist who would not go to the expense of a nitrometer would, by its very simplicity, be tempted to test his sp. æther. nit. if he had any reason for doubting its strength. Of course, strict accuracy cannot be claimed for it, but it is sufficiently accurate for testing according to the B. P. The materials for constructing it could, we venture to say, be found in every chemist's shop, while the cost would not exceed a shilling. It is extremely simple of construction, is not complicated in any way, and, when made, the process of testing a sample of sp. æther. nit. is both interesting and easy; in fact, it could be successfully performed and understood by any senior apprentice of average intelligence.—A. E. SLININ and H. STUBBINS in *Pharm. Journ.* (Sept. 7th).

Artificial "Narceine" Therapeutically Worthless.

SOME time ago a process was discovered and patented for preparing what was supposed to be true narceine (occurring naturally in opium) from narcotine, by converting the latter into methylnarcotine chloride, treating with soda and then with water. The ultimate composition agreed with that of true narceine, and also the physical properties. On the strength of this, a good deal of artificial narceine has been manufactured and put upon the market.

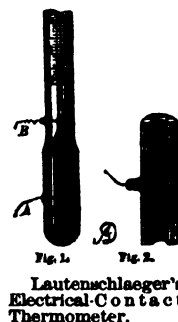
It is now pointed out by Roser (*Liebig's Annalen*, 254, 357) that narceine is not at all related chemically to narcotine and cannot be derived from it. Claus and Meixner have shown that it is a derivative of naphthalin. Moreover, Prof. Filehne, of Erlangen, has informed Roser that the physiological effects which have been ascribed to the artificial narceine—which should be called pseudonarceine—are chimerical, and that it has no narcotic properties whatever.

AN ELECTRICAL-CONTACT THERMOMETER.

UP to the present, an adjustable thermometer-alarm with a sealed mercury column has been a great desideratum. There is an adjustable *open-tube* thermometer, which is, however, not very accurate. And there is a closed-tube thermometer with immovable platinum points (fused in the glass), which is, of course, only serviceable for the particular temperature it is made for.

M. Stuhl, of Berlin, has now overcome the difficulty and constructed an adjustable closed-tube thermometer, which is here described.

Below the beginning of the scale of the thermometer there is a small resistance, in the shape of a knob of glass, fused into the bore of the thermometer tube (see C in Fig. 1, and the enlarged view in Fig. 2). This knob leaves a fine capillary passage for the mercury upward when it expands by heating, but causes the mercurial column to break at the contraction upon cooling, so that all the mercury above the knob will be retained there, while that below the contracted place will separate and contract into the bulb, on the same principle as is carried out in the registering clinical thermometers. Immediately below the knob, a platinum wire (forming one of the electric poles) is fused into the glass. The other wire (or pole) is fused into the bulb, and is constantly in contact with mercury.



When the thermometer is to be set for a particular temperature—assuming that the mercurial column is continuous, or has been rendered so by shaking the mercury down—it is heated in any convenient manner until the exact point on the scale (say, for instance 40° C. = 104° F.) has been reached by the mercury. It is then removed from the source of heat and allowed to cool. As it begins to cool, the mercurial thread will be ruptured at the contracted place, and the mercury below will shrink into the bulb, while the mercurial column above the knob will also shrink proportionately. If now the thermometer is heated again until the mercury above the knob again stands at 40° C., the mercury in the bulb will also again expand so as to reach the upper column terminating at the knob. Just before reaching it, it will pass and touch the wire entering at B. If the wires are connected with a battery with interposed electric bell, the latter will immediately ring. When the temperature falls, the mercurial thread will break again as before and the alarm cease. The distance between the contracted place and the entrance of the wire B is so small that it has no influence (or scarcely any) upon the exact temperature. When a different temperature is to be fixed upon, the mercurial column is reunited by shaking or swinging, and adjusted, as above described, to the new place on the scale.

This thermometer is patented, and is sold by F. & M. Lautenschlaeger, of Berlin. It may be obtained through importers of chemical apparatus.

Quick Preparation of Surgical Gauzes.

H. HELBIG suggests the following mode of preparing surgical gauzes at short notice:

Good raw material is of the first importance in preparing gauzes. This should be perfectly free from fat, should have at least thirty threads each way in a square inch, and should weigh about 10 drachms to the square yard. This is about the average for good stuff, though if we examine the various gauzes on the market we shall find that only the very best houses furnish a material of this standard. I have myself examined a number of samples and give a few of the figures:

Samples.	Weight of square yard.	Number of threads per square inch.
1	12 drachms.	44 x 44
2	10 "	31 x 31
3	7 "	15 x 15
4	6 "	17 x 17
5	5½ "	26 x 26
6	5 "	27 x 17

Gauze is sold here by measure, an entirely wrong principle, as, unless the buyer knows the weight and the number of threads, he cannot tell what he gets for his money. Supposing the samples I have given you were all made into 10 per cent iodoform gauze. Nos. 1 and 2, as you will readily understand, would contain nearly double the amount of iodoform in each square yard of any of the others, and if when finished they were charged at double the rate of the others it would only be a fair price. This shows how important it is when procuring such articles to ascertain the weight of the gauze and the number of threads. Of course the gauze should also be tested to see that it contains the percentage of antiseptic claimed.

Gauzes are usually kept ready by the chemist, but it may sometimes happen that a medical man may want a gauze for a case of emergency, and if the chemist have none in stock he cannot supply, as he is unable to procure it in time. In such urgent cases it is an advantage to be

able to prepare the gauze one's self, and this can be done in a few minutes by following these directions. Take the necessary quantity of raw material, and then weigh out a corresponding amount of the antiseptic.

The material is now saturated with ether or a mixture of alcohol and ether, in which the antiseptic has been dissolved, one ounce of the material requiring about three ounces of liquid. The gauze is several times wrung out and again saturated, so as to insure uniform impregnation, and for drying the gauze is now simply unfolded and shaken a few times, when it is ready for use.

In this manner all the different gauzes may be prepared—carbolic, corrosive sublimate, iodoform, thymol, eucalyptol, or any other.—*Pharm. Journ.*

Oleates.

In an elaborate paper read by G. M. Beringer, Ph.G., before the Philadelphia College of Pharmacy on the 19th of November, the author gives the following suggestions for preparing the oleates most commonly in demand, remarking that the correct specific gravity of oleic acid is 0.890 to 0.900.

Oleate of Zinc.—

Oleic Acid.....	1,000 grains.
Soda.....	160 " (or q. s.)
Alcohol.....	6 fl. drachms.
Sulphate of Zinc.....	550 grains.
Water.....	a sufficient quantity.

Warm the oleic acid in a capacious vessel on the water-bath to a temperature of 140° to 150° F. (60° to 66° C.), and, having dissolved the soda in a mixture of the alcohol and 2 fl. oz. of water, add slowly the soda solution, stirring constantly until the acid is entirely neutralized, and a small portion of the resulting soap dissolved in alcohol yields but a faint pink tint on the addition of a few drops of alcoholic solution of phenolphthalein. Dissolve the resulting soap in 3 pints of warm water, and filter if necessary. Dissolve the sulphate of zinc in 1 pint of water, and filter. Warm the solution to 110° F. (43° C.), and slowly add the zinc solution to the soap solution, stirring constantly. Collect the precipitate on a moist filter, wash thoroughly with distilled water, and finally dry on bibulous paper at a temperature not exceeding 100° F. (38° C.).

The excess of sulphate of zinc ordered tends to the more ready separation of the oleate produced. By maintaining a temperature of 100° to 110° F. during precipitation, the oleate, on drying, becomes a white, friable mass which is easily powdered by rubbing through a sieve, whereas if a much lower temperature is used the resulting curdy masses are glutinous and almost impossible to pulverize. If precipitated at a higher temperature, the mass will be greasy, and will be dried and pulverized with difficulty, and give a gritty powder. As thus obtained, oleate of zinc is a nearly white, impalpable, unctuous, slippery powder, fusing at 75° C., very soluble in ether, carbon bisulphide, chloroform, and benzol, somewhat less soluble in turpentine, petroleum ether, and alcohol. The yield of this process is 1,122 gr., the difference above the theoretical yield of 1,115 gr. being most likely due to retained water.

Oleate of Copper.—

Oleic Acid.....	1,000 grains.
Soda.....	160 " (or q. s.)
Alcohol.....	6 fl. drachms.
Sulphate of Copper.....	442 grains.
Water.....	q. s.

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in 3 pints of water. Dissolve the copper salt in 1 pint of warm water, and filter. Warm the solutions to about 140° to 150° F., and slowly add the copper solution to the oleate of soda solution, stirring constantly. Warm until the oleate of copper fuses into a mass, decant the clear liquid, wash several times with warm water, and dry on the water-bath. Yield, about 1,100 grains; theoretical yield, 1,108 grains.

Product a bright green, waxy mass, fusing at 49° C., very soluble in carbon bisulphide, chloroform, benzol, ether, turpentine, petroleum ether, absolute alcohol, alcohol, and fixed oils.

Oleate of Mercury is the oleate most frequently prescribed, and which, made according to the Pharmacopœia by dissolving the oxide in oleic acid, is a very unstable compound, the excess of oleic acid being the prime factor in its decomposition.

Oleic Acid.....	1,000 grains.
Potassa.....	220 " (or q. s.)
Red Oxide of Mercury.....	888 "
Nitric Acid.....	828 " (or q. s.)
Alcohol.....	6 fl. drachms.
Water.....	q. s.

Saponify the oleic acid with the potassa, as directed in the formula for oleate of zinc, dissolve the resulting soap

* The granular soda known as Banner lye, containing about 90 per cent of soda, was found to answer well for this purpose.

in 2 pints of warm water, and filter. Mix the nitric acid with 2 fl. ounces of water, heat to boiling, and add the mercuric oxide, previously reduced to powder. Boil until it is entirely dissolved, adding, if necessary, a few additional drops of nitric acid. Dilute the solution of mercuric nitrate with 4 fl. ounces of water. Warm both solutions to 150° F. (66° C.), and add the oleate of potassium solution to the mercury solution, stirring constantly. Decant the watery solution, and wash the precipitate with warm water not exceeding 150° F. If precipitated at a much lower temperature, it will be necessary to heat the mixture to near boiling in order to form a mass of the precipitate, which heating is almost certain to result in a partial decomposition of the oleate. The same is apt to result if the solutions are mixed at a higher temperature.

The yield by the above formula was practically 1,329 grains; theoretically, 1,350 grains. It is about the color of a pale citrine ointment, and of somewhat softer consistence; fuses at 150° F. (66° C.); yields an entirely clear fluid at 70° C. It is very soluble in carbon bisulphide, chloroform, ether, and turpentine; yields an opalescent solution in benzol and petroleum ether, and is slightly soluble in absolute alcohol and alcohol.

The aqueous solution decanted from the precipitate gave no indications of mercury with solution of potassa or potassic iodide.

Oleate of Bismuth is the most difficult oleate to prepare by double decomposition:

Oxide of Bismuth dried at 212° F. (100° C.), until it ceases to lose water.....	1 tr. oz.
Oleic Acid.....	3 " " and 295 grains.
Water.....	q. s.

Rub the oxide of bismuth to a fine powder, and mix it thoroughly with the oleic acid in a capacious vessel. Add 2 pints of water and boil the mixture, replacing the water as it evaporates, and stirring frequently until complete saponification has taken place and a small quantity of the mass dropped in cold water yields an ointment-like mass without any separation of oleic acid. Decant the water from the oleate, and work the mass with a horn or wooden spatula to free it from retained water.

The mass is cream-colored, of ointment consistence, softens at the temperature of the body, and melts at 58° C. It is easily decomposed by contact with metals, and is but very slightly soluble in the usual solvents for oleates.—*Amer. Jour. Pharm.*

Pills and their Excipients.

THE following suggestions are from a paper read by Mr. A. S. Smith before the Sheffield Pharmaceutical and Chemical Society:

Of course the simplest excipient is undoubtedly the best. For masses which contain a large proportion of vegetable powder (as in the case of pil. morph. grain $\frac{1}{2}$, which is to be made up with some inert vegetable powder), I have found nothing better than simple syrup with a few grains of pulv. tragacantha. Of course the tragacanth is to be added after the mass is made.

Glycerin, on account of its property of keeping many pills soft, is much used; it is very treacherous, however, and must not be used in masses which contain iron, as it makes such masses very brittle and crumbly.

Glycerin and tragacanth, in the form of Proctor's paste (which contains a greater proportion of water than the official), is very useful and makes better masses of metallic salts than syrup and tragacanth. In most other cases, however, I have got better results and in less time with syrup, etc.

For the benefit of those amongst you who have not yet tried it and would care to do so, the following is the recipe:

Pulv. Tragacanth.....	3 i.
Glycerin.....	3 iij.
Water.....	3 i.

Extract of malt is an excipient which I cannot but think has only to be better known in order to be more generally used; it has given excellent results in most masses containing iron. I have here a mass composed of ferrum redact. grains 24 and quin. sulph. grains 12. It was massed with extract of malt a fortnight ago, and is still in a good condition, a result with difficulty obtained with any other simple excipient. I have also a mass of quin. sulph. alone which was made at the same time. It is in a splendid condition and was massed with the same excipient, which is preferable to confection of roses on account of the bulkiness of the latter, and is superior to tartaric acid for therapeutic reasons. While I am speaking of extract of malt I may say I have noticed that the following B. P. pill masses, viz.: Pil. ferri carb., pil. coloc. co., pil. aloes et ferri, pil. aloes et myrrhæ, and pil. aloes et asafetidæ, all get extremely hard after being kept some time. I have substituted extract of malt for the official excipient in the three following: Pil. ferri carb., pil. coloc. co., and pil. aloes et ferri. They have now been made more than a week, and I invite your attention to their present condi-

tion. I have no doubt that equally good result could be obtained in all the cases named.

Soap powder, as you all know, has its special purposes. In the case of creosote pills I have found the powdered animal soap far superior. I have here a mass made by digesting at a gentle heat, in a wide-mouthed bottle, by means of a water-bath, equal parts of animal soap and creosote until thoroughly mixed, and, after allowing to cool, massed by the addition of $1\frac{1}{2}$ grains of powdered licorice to every minim of creosote. Yellow wax is much used for this mass, but is too indigestible. Bread crumb has deservedly gone out of favor for this mass.

I have found the compound decoction of aloes an excellent excipient for pills containing a large quantity of aloes; a very small quantity suffices, and it gives a splendid polish to pills, thus dispensing with powder. Incompatibility should of course be guarded against. Canada balsam makes good pills with deliquescent salts, such as potassium acetate, potassium citrate, and calcium chloride; it is also useful for benzoic acid. Pills thus made should be coated with varnish, and if meant to be kept must be kept in a stoppered bottle.

Calcii phosph. and magnes. calc. are very useful on account of their drying properties. They may be used in conjunction with cera flav. in small quantities in pills containing much oil. In using them plenty of time must be given, and magnes. calc. is very liable to make pills insoluble.

I must now leave this part of my subject, and will proceed to treat of a few substances which may occasion some little trouble when met with, and which have not been touched upon while speaking of excipients.

Butyl chloral hydrate is best managed with a thick mucilage. It may not be out of place here to say that one of the greatest drawbacks of this excipient is its acidity.

Burgundy pitch can be made into a good mass with pulv. tragacanthæ co.; it is here that the hot plate comes into requisition, by the aid of which it is easily manipulated.

Carbolic acid is not, at any rate, the most pleasant substance to make into pills; many things have been recommended, such as soap, wheat flour, marshmallow powder, etc. I have here a mass which leaves nothing to be desired, prepared according to the following formula:

R Carbolic Acid Crystals	grains iss.
Pulv. Glycyrrh. Decort.....	grains iv.
Mucilage of Acacia.....	q. s.
Fiat. pil. 1.	

Croton oil, owing to its small dose, can be treated with success in the same way.

Tannic and gallic acids can be massed with thick mucilage; the addition of a little glycerin to keep them soft will be found very serviceable.

Camphor makes a satisfactory mass with a small quantity of soap, say 1 grain to every 6, and massed with either simple syrup and tragacanth, or Proctor's paste if intended to be kept any time. I think the latter is preferable,—that is, if the size will permit its use.

Chloride of calcium, being so deliquescent, is exceedingly troublesome. I have here some pills containing 3 grains of that substance; they were made by the addition of half a grain of resin to each, and massed with Canada balsam. They have been varnished and have kept their shape perfectly.

Potassium permanganate is another troublesome substance to deal with. I have some pills here containing 3 grains made with the addition of half a grain of pulv. resinæ and powdered fuller's earth 1 grain, and massed with vaseline; they are much firmer than if made with ung. resinæ alone. Kaolin ointment makes a good mass, but is not always handy at the dispensing counter.

The bulkiness of most scale preparations can be greatly reduced by the addition of a few drops of water, and may be massed with pulv. tragacanthæ co. and simple syrup.

Soluble crystalline salts, such as potassium iodide and potassium bromide, must be treated with aqua destillata, in order to lose their crystalline form; they can then be massed with pulv. glycyrrh. and simple syrup with tragacanth, as in the following:

R Potassii Iodid	3 ss.
Aquæ Dest.....	℥iv.
Pulv. Glycyrrh.....	grains x.
Syrupi et Tragacanthæ	q. s.

Essential oils are a class upon which no fixed rule can be laid down; it is here more particularly where good judgment is of the greatest value in the choosing of an excipient. Soap is useful, but the question of incompatibility must not be overlooked.

Cera flava for colored and cera alba for colorless oils are very useful, but should be used sparingly; in fact, we would do well to remember to avoid their use where possible. Liq. potassæ, with all its drawbacks, is a very good friend in those cases where there is a superabundance of oil to be combined with an extract of resinous ingredients. A drop or two will sometimes work wonders.

I have here some pills made from the following recipe which I had to negotiate during last week:

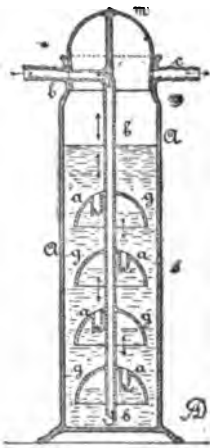
R Zinci Valerian.....	36 grains.
Creosoti	18 "
Pil. Asafoetid. Co.....	36 "
Pulv. Rhei.....	18 "
Pulv. Camph.....	18 "
Ft. mas. divid. in pil. 36.	

As will be seen, each pill contains half a minim of creosote and one grain of zinci valerian., besides the camphor, none of which are particularly nice things to manage. I took care of the creosote by mixing it with an equal quantity of pulv. saponis animalis in a warm mortar; I then rubbed down the camphor in another mortar and mixed it with the pulv. rhei and zinci valerian., after adding it to the soap and creosote, and by using an equivalent quantity of pulv. for pil. asafoetidis co. I got a splendid mass by the final addition of half a grain of calcii phosph.

I will conclude my remarks with a few words on those cases where a potent remedy is to be administered. An intimate mixing and perfect combination is here of the greatest importance; this end is best acquired by presenting the drug in the form of a solution. In these particular cases glycerin is especially useful; for instance, by its means hyd. bichlor. and strychnia may be first dissolved and massed with some inert vegetable powder. I think it is now generally admitted that such pills should be made up to the size of one grain.—*Pharm. Journ.*

KUEHNLENZ'S WASH BOTTLE.

FOR the purpose of compelling a gas to remain in prolonged contact with a wash liquid, F. A. Kuehnlenz has devised the wash bottle here illustrated. The internal tube carries four glass bells which successively catch the current of gas discharged lower down, thus insuring a more perfect washing. The inlet and outlet tubes *b* and *c* are separate pieces fused into the neck of the bottle. By a simple turn of the ground stopper *m*, these two tubes may be set out of communication and the current stopped. (Germ. Pat. 48,277).



Medicated Cotton.

THE new Dutch Pharmacopoeia (Pharm. Neerlandica) has a series of antiseptic cottons, as follows (after *Chem. and Drugg.*):

Styptic Cotton (with ferric chloride).—Absorbent cotton, 75; ferric chloride solution (neutral, spec. grav. 1.441–1.448), 60; rectified spirit, 75. Spread out the cotton and sprinkle it uniformly with the liquids previously mixed. Then pack in a closed bottle and leave it so for a day, until the solution has equally soaked throughout; then dry at a temperature not exceeding 40°, until the whole weighs 100 parts. The cotton contains 25 per cent of anhydrous ferric chloride. It should be kept in a closed vessel.

Sublimate Cotton.—Take 379 parts of absorbent cotton, spread it out, and sprinkle upon it a solution of 1 part of corrosive sublimate, and 20 parts of liquid paraffin in 400 parts of ether. Keep for a day in a stoppered bottle, then dry. The final weight of the cotton should be 400 parts. It contains 0.25 per cent of corrosive sublimate.

Iodine Cotton.—Ninety parts of cotton are heated to a temperature of 80° in a stoppered bottle with the stopper out, while in this 10 parts of iodine, wrapped in a piece of filtering-paper, are introduced, and the heat continued until the iodine has thoroughly impregnated the wool.

Iodoform Cotton.—Cotton, 90 parts; iodoform, 5 parts; liquid paraffin, 5 parts; ether, 90 parts. To make 100 parts of iodoform cotton in the same manner as sublimate cotton.

Phenol or Carbolic Cotton.—Absorbent cotton, 93 parts; phenol, 2 parts; liquid paraffin, 5 parts; ether, 100 parts. To be made in the same manner as iodoform cotton. Product should weigh 100 parts.

Variegated Colors for Show Bottles.—Take equal volumes of chloroform, glycerin, a mixture of one volume stronger ether and three volumes carbon disulphide, water, cotton-seed oil, and alcohol. Shake the chloroform with a little water, then separate the excess; to the chloroform thus saturated with water add a little bengal red, shake well a few minutes, and filter. In the ether and carbon disulphide dissolve a little iodine. In the alcohol dissolve a little bengal green or chlorophyll from fresh green leaves. Now pour these various colored fluids into a clear flint-glass bottle or other similar container just large enough to hold them all, beginning with the chloroform and following with each in succession down to the alcohol. They should all be added carefully down the side of the container and without agitation, and, lastly, enough more alcohol should be added to completely fill the container after the insertion of the cork. This will give a bottle with six separate layers of colored fluids, and presents a very pretty sight.—*The New Idea.*

The Preparation of Microscopical Sections from Barks and Roots used in Pharmacy.

At a recent meeting of the London Chemists' Assistants Association, the following paper was presented by M. J. Cole :

Barks and roots that have been dried must be cut into small pieces and soaked in water for several hours; this will cause the tissues to swell up and regain, to a certain extent, their natural shape. They are then to be transferred to methylated spirit, which should be changed every twenty-four hours until no color comes away from the tissue. They will then be ready for cutting into sections, or they may remain until required.

Fresh specimens should be cut into small pieces and placed in methylated spirit, which should be changed until no color is given off from the tissue. The hardening will usually be complete in a week, or they may remain for any length of time until required for cutting.

Some barks will be found too hard to cut; they may be softened by soaking for a time in liquor potassæ, then wash well in water until all trace of potash is removed.

Section-cutting.—Fairly good sections may be made by hand with an ordinary razor. Hold the piece of tissue in the left hand, keeping the forefinger straight so that it may form a rest for the blade of the razor to slide on. A good strong army razor answers very well. Hold it firmly in the hand and keep the handle in a line with the blade, and draw it from heel to tip through the tissue towards yourself. Keep the blade well wetted with dilute methylated spirit, and as the sections are cut place them in a saucer of spirit or water.

Section-cutting with a Microtome.—If really good sections are required, a microtome of some kind should be employed. A very good and complete instrument, capable of being used for making all kinds of microscopical sections, can be obtained from Messrs. W. Watson & Sons, of 313 High Holborn. Screw the microtome to a firm table, and, with the tube supplied with the machine, punch out a cylinder of carrot to fit the well of the microtome. Cut this in half longitudinally, and scoop out sufficient space in one half to take the tissue to be cut. Put the other half of carrot in its place, and make sure that the tissue is held quite firmly, but it must not be crushed. Now place the whole in the well of the microtome and commence to cut the sections with a strong razor, or the section knife that is supplied with the machine. When desired, keep the blade of the knife well wetted with dilute spirit, and as the sections are cut place them in a saucer of spirit or water.

Bleaching.—Vegetable sections generally require bleaching before they can be properly stained. A solution of chlorinated soda is usually used. Soak the sections in distilled water to remove the alcohol. Pour off the water and add a quantity of the bleaching solution, and allow it to act for from three to twelve hours, or until all color has disappeared from the sections, then transfer to water, which must be changed several times until all trace of soda is removed.

Staining Sections.—The best staining fluid for general purposes is logwood. Take 2 ounces of ground logwood chips, place them in a calico bag, and run water through it until scarcely any color comes away. Drain away as much water as possible, remove the logwood from the bag and spread it in a thin layer on a tray to dry. Dissolve 2 drachms of potash alum in 12 ounces of distilled water. Put the logwood into a vessel, pour on the alum solution, and let it stand for forty-eight hours. Strain through muslin, and add 4 ounces of glycerin and 1 ounce of rectified spirit, mix well together, filter through paper, and add a small lump of camphor to make the mixture keep. Place the section in distilled water.

Add from 30 to 40 drops of the logwood solution to an ounce of distilled water, filter, and immerse the section for three or four hours. Wash well in distilled water and then soak for a short time in ordinary tap water to fix the color.

Transfer to methylated spirit for ten to fifteen minutes to dehydrate.

Take a small saucer or watch-glass full of clove oil and carefully float the section on to the surface of the oil and let it soak for five or ten minutes. When quite clear, wash in turpentine and mount in Canada balsam.

The logwood solution may be used undiluted for quick staining, but better results are obtained by the slower process.

Mounting in Canada Balsam.—Take 4 ounces of dried Canada balsam and dissolve in 4 fluidounces of benzol, filter, and keep in a good outside-capped bottle.

Clean a slide, place some balsam on its centre, take the section from the turpentine with a lifter, and place it in the balsam on the slide. Now clean a cover glass, and with a pair of forceps bring its edge in contact with the balsam on the slide; ease it down carefully so that no air bubbles may be enclosed, and press down until the section lies quite flat. Now put the slide away for a day or two so that the balsam may set, and then take a soft brush and with some benzol wash away the exuded balsam from around the edge of the cover. Allow the slide to dry and apply a good coat of gold size, and when this has

dried wash the slide with some soap and water, dry well with a soft cloth, and add a coat of asphalt.

Double Staining.—

Aniline Acid Green Stain.

Acid Green.....	2 grains.
Distilled Water.....	8 ounces.
Glycerin.....	1 ounce.

Mix the water and glycerin well together and dissolve the green in the mixture.

Carmine Stain.

A.

Borax	10 grains.
Distilled Water.....	1 ounce.
Glycerin.....	½ ounce.
Alcohol.....	½ ounce.

Dissolve the borax in the water and add the glycerin and alcohol.

B.

Carmine.....	10 grains.
Liq. Ammonia	20 minims.
Distilled Water	30 minims.

Dissolve the carmine in the ammonia, in a test tube, with the aid of heat if necessary, and add the water. Mix A and B together and filter.

Place the section in the green stain for five to ten minutes. Wash well in distilled water. Place in carmine stain for ten to fifteen minutes, wash in methylated spirit, in which the section must remain for at least ten minutes. Clear in clove oil and mount in C. balsam.

Mounting Sections in Glycerin Jelly.—Place the section in distilled water and soak until all trace of alcohol is removed. Warm the jelly and place a few drops on the centre of a clear slide, and put the section in it. Clean a cover glass and apply it in the same way as directed for balsam. Allow the slide to cool, and then the exuded jelly may be scraped away with a penknife and the slide washed with water. Dry well with a soft rag and apply a coat of gold size, and when this has dried add another of asphalt.—*Pharm. Journ.*, December 21st.

The Borax Lake and Industry in California.

At a recent meeting of the Society of Chemical Industry, Mr. C. Napier Hake read the following paper:

The history of the discovery of borax and borates in Nevada may be briefly summed up as follows:

In 1864, some borate of lime in the form of cotton balls (ulexite) was found in Columbus Marsh, but no particular notice was taken of this discovery beyond sending specimens to Washington, where they found a place in the cabinet of the National Museum. Between 1869 and 1871, a systematic search was made which resulted in the re-discovery of the deposits in Columbus Marsh, and other deposits of ulexite near salt wells. These deposits were worked for a short time only. In 1873, the deposits known as Borax Lake and Teel's Marsh were discovered. The former lies in the Mojave Desert, the latter in Nevada. Both deposits are very extensive. A little later a third deposit was discovered near Dagget, consisting of borate of lime (colemanite).

Situation of Borax Lake.—The Borax Lake is situated in the extreme northwest corner of San Bernardino County, and is 450 miles distant from San Francisco in a southeasterly direction.

Mojave station, on the Atlantic and Pacific Railway the nearest point of shipment, is connected with the lake by a good wagon road 72 miles in length.

The lake lies in the valley of the Slate Range and Argus Mountains, at an elevation of 1,700 feet above the sea. It is oval in shape, and its greatest length and breadth is 12 miles by 8 miles. The greater part of it is covered with a hard saline incrustation, varying in thickness from a few inches to several feet. The surface is covered with white efflorescent matter largely mixed with sand. Under the hard crust, the lake consists of one vast bed of black mud containing a large proportion of iron sulphide saturated with saline matter and strongly impregnated with sulphuretted hydrogen gas. The thickness of this mud-bed has not been determined.

In the lake are contained common salt, carbonate of soda, hydrated and anhydrous bicarbonate of soda, baborate of soda, sulphate of soda, hydrated and anhydrous sulphate of magnesia, salts of ammonia, and traces of bromine and potash. Although I made a diligent search, during the four weeks I remained on the lake, I was unable to detect a trace of iodine. A new and highly interesting mineral has been discovered in the mud of this lake in small hexagonal crystals, to which the name of "hanksite" has been given, after Professor Hanks, of San Francisco, whose name is so honorably connected with the mineral devel-

opment of California. Its composition is expressed in the formula: $4\text{Na}_2\text{SO}_4, \text{Na}_2\text{CO}_3$.

The lake may be for all practical purposes divided into three sections, each section representing well-defined deposits of—

- (1) Biborate of soda;
- (2) Bicarbonate of soda; and
- (3) Common salt.

The borax occupies the northern portion of the lake. A very pure deposit of bicarbonate of soda lies on the north-eastern shore. The remaining surface deposits consist chiefly of common salt, which becomes purer towards the southern extremity of the lake.

The common salt and bicarbonate of soda deposits have at present no commercial value. The latter is, however, of considerable interest as an example of the ammonia-soda process being carried on by nature. All the ingredients necessary for this process are contained in the waters underlying the deposit, viz., ammonia, carbonic acid, and common salt. The deposit is from 6 inches to 18 inches thick, and in many places almost chemically pure.

Crystal Beds.—Near the centre of the borax section, which is the lowest level of the lake, there exists a patch covering an area of about 300 acres, which is nearly always covered with water to a depth of from one inch to a foot. This patch is called “the crystal bed,” from the fact that the mud underlying the water is full of large crystals. These crystals are not deposited regularly, but form nests several feet in thickness and penetrating 3 or 4 feet downward.

The spaces intervening between these nests are filled up with mud, and are comparatively free from crystalline deposit. By damming off the water I was enabled to make an examination of some of these nests. The crystals thrown out consisted of carbonate of soda and common salt, with a large proportion of borax, some of the crystals of which measured as much as 7 inches. During one exceptionally dry season, when the water was low, about 700 tons of borax were refined from this source.

The underlying water, at a depth of 15 feet, contains carbonate of soda, chloride of sodium, sulphate of soda, borax, and salts of ammonia.

The ground around this crystal bed consists of a dry, hard crust about 1 foot thick. This crust contains carbonate and sulphate of soda and about 1 per cent of borax. On this hard crust there is, again, another deposit of efflorescent matter, containing about—

Sand.....	50 per cent.
Sulphate of Soda.....	16 “
Common Salt.....	12 “
Carbonate of Soda.....	10 “
Borax.....	12 “

This surface deposit represents the chief source of raw material for the manufacture of refined borax.

The deposit is worked in the following manner:

Method of Working Deposit.—When the crude efflorescent surface has accumulated to a depth of about 1 inch in thickness, it is loosened by means of a shovel and swept into windrows, space being left between each windrow to allow of the passage of a cart.

The surface thus cleared of its salts begins to renew its coating. The moisture, as it creeps upwards, is evaporated by the heat of the sun, leaving the solid matter, which is held in solution on the surface. This action is allowed to go on for three or four years before the surface is again disturbed. In order to get some idea as to the proportionate growth of the different salts contained in this efflorescent matter, I took samples representing six months' growth, two years' growth, three years' growth, and four years' growth. From all the sections from which these samples were taken the surface has been removed three or four times within the last twelve years, and in most places marks of the old windrows were visible.

Analyses of Crude Borax Material from Dry Lake :

	6 Months' Growth.	2 Years' Growth.	3 Years' Growth.	4 Years' Growth.
Sand.....	58.0	55.4	53.4	53.8
Carbonate of Soda.....	5.2	5.0	8.1	8.0
Sulphate of Soda.....	11.7	6.7	16.6	16.0
Chloride of Soda.....	10.9	20.0	11.1	11.8
Borax.....	14.2	12.9	11.8	10.9
	100.0	100.0	100.0	100.0

The analyses show that the first six months' growth is richest in borax, and that the proportion of carbonate of soda to borax appears to increase regularly. The presence of sand in such large quantities is due to the high westerly winds which blow periodically and drive it from the mountain slopes across the lake. This sand, no doubt, facilitates the formation of the surface deposit by keeping the ground in a porous condition.

That only this section of the lake produces borax to any extent is due, no doubt, to its low level. The hard crust above mentioned dips in the water, which rises by capil-

lary attraction. This contact appears to be a favorable if not a necessary condition, for during very dry seasons, when the level of the water is low, surface recuperation goes on very slowly or even ceases entirely.

Process of Manufacture.—The factory, which is situated on the northwest corner of the lake, consists of a dissolving house, raised about 20 feet above the level of the ground, concentration house, a refining house, and boiler house. The process by which the borax is extracted from the crude material is very simple, and comprises two operations, viz., dissolving and allowing the solution to crystallize.

The crude material is transported by means of carts from the lake to the works, and is passed through a mill previous to its being thrown into the dissolving pan, in which is contained a boiling saline solution, preferably mother-liquor from the second crystallization. The solution is kept boiling by high-pressure open steam as the crude material is being shovelled into it, during which operation free ammonia is copiously given off. The salts dissolve entirely, leaving the insoluble residue, chiefly sand, at the bottom of the pan. The hot solution, after standing for some time in order to clarify, is run off into crystallizing pans and allowed to cool for from five to nine days, according to the season of the year.

The product of this first crystallization is a mixture of octahedral and prismatic borax, slightly impure and somewhat colored by organic matter. This product is either sold as “concentrations,” or redissolved in boiling mother-liquor and the resulting solution allowed to cool to 120° F. From this solution refined borax of excellent quality is obtained. The works are capable of turning out over 100 tons per month, about fifty men and sixty-five animals being employed. The factory is exceedingly well arranged and substantially built, and under careful and intelligent management.

During the time of my visit at the lake the fuel used on the works was the sage brush, the only wood growth in this desert. The difficulties of collecting this material were enormous. Carts were sent out scouring the country for ten miles round in search of fuel, and remained away often for a week at a time. This difficulty has been partially met by substituting crude petroleum, which has to be carted seventy-two miles across the desert. The results, however, I am told, show a saving of nearly 40 per cent as against the sage brush, besides other advantages, such as greater regularity of working.

Water Supply.—The question of water supply is an extremely interesting one. The water is obtained from two sources. The one which is used for drinking purposes and for feeding the boilers is brought in iron pipes from a cañon lying in the Argus range, 7½ miles distant from the works, at an elevation of nearly 300 feet. This cañon, which forms an oasis in the desert, contains several springs, and where cultivated yields an abundance of fruit and vegetables.

The other supply is drawn from artesian wells which are sunk to a depth of 55 feet on the shores of the lake. The water rises from 3 to 10 feet above the surface, and the flow is constant and regular.

This water is strongly alkaline, containing about 1 per cent of carbonate of soda, strong traces of borax, and salts of ammonia equal to about 18 grains per gallon.

Labor.—The question of labor presents no difficulties; all common operations are carried on by Chinamen, and this class of labor can be procured in California at a comparatively moderate rate.

Transport.—The refined borax is packed in casks and transported to Mojave in the so-called “desert schooner,” a strongly built wagon drawn by 20 mules. The average load is 10 tons, and the trip to Mojave and back takes eight days. The road through the light sandy soil of the desert rises gradually 1,000 feet during the first 25 miles.

This road is controlled by the owners of the lake, who possess the right to the water, which is supplied to the four roadside stations through iron pipes from a range of mountains 10 miles distant. These stations afford sleeping accommodation for the teamsters and stabling for the animals.

During my visit to California I took every opportunity of making myself acquainted with the extent and value of the borax deposits in the Pacific States, and I gathered that, though widely distributed, there are only three deposits of any great importance which are actually being worked at the present time. These deposits yield from 1,500 to 2,000 tons of borax annually, nearly the whole of which is consumed in the United States.

The lake which I have described has been regularly worked for the last fifteen years under the direction of Mr. J. Searle, the chief owner, who is known all over California as the keenest bear hunter in the State; but he is not less known for his hospitality, high integrity, and intelligence. During this period it has supplied about one-third of the total amount derived from similar sources, and with considerable profit to the owners. The supply of borax on this lake appears to be practically inexhaustible, and it only requires improved means of transport for its full development.

In conclusion, it may be of interest to briefly allude to Death Valley, which lies 400 feet below the level of the

sea. Borax and borate of lime deposits have been discovered and worked in this valley, which is probably the most desolate and least explored of any portion of the United States. The climate, owing to the intense heat and dryness of the atmosphere, is almost unbearable. It is absolutely devoid of either animal or vegetable life. During several months in the year work has to be suspended, one reason being that the solution would not cool down to a temperature at which crystallization takes place.

Saccharin in Belgium.

SOME time ago a heavy import duty of 140 francs per kilogramme, practically amounting to prohibition, was placed upon saccharin in Belgium, in the supposed interest of the sugar industry. It is now discovered, however, that this law is quite inoperative, the consumption of the sweetener being noticeably on the increase and the article being freely obtainable from a number of dealers, while yet not a single ounce has passed the custom-houses since the promulgation of the new law, and no instances of smuggling have been traced. The explanation is now given that in the preparation of commercial saccharin the process is one of seven distinct stages. The product of the sixth stage is quite different from saccharin in physical and chemical properties, and to it, consequently, the duty cannot be applied. In this state it is imported into Belgium, and across its frontier it is subjected to the final process—a simple treatment with an acid, which converts it into the commercial article.—*Chem. and Drugg.*

The Source of Pumice Stone.

THE supply of pumice stone used in the arts is at present derived mainly from the island of Lipari, in the Tyrrhenian sea. The island is of no general interest, and is scarcely visited at all by any but Italians engaged in trading in its productions, such as currants, capers, wine, and pumice. It is mountainous in character, and consists of tufas and lavas, and of highly siliceous volcanic products. The district where the stone is found is called Campo Bianco or Monte Petalo (1,500 feet above the level of the sea). It is an interesting ride there upward from the town. The views obtained of land and sea during the ascent are very fine, and the effect produced by the first sight of the pumice deposit is curious, for after riding a considerable distance, partly along precipitous paths sufficiently dangerous to be interesting, and partly through vineyards and over grassy plains, one almost suddenly comes upon a seemingly snow-clad, narrow valley, enclosed by hills also quite white, and the whole glaringly bright on a sunny day such as can be experienced in this southern latitude. Into these hills workmen are ceaselessly digging deep burrows, working within by candle-light. In their excavations they come across many lumps of pumice stone, which are placed in baskets, subsequently being conveyed along the valley to the seashore, where small boats are loaded and sailed to the seaport near by, where the stone is sorted, packed, and shipped to distant parts either *via* Messina or Leghorn. Some years ago it was almost the general custom to send the stone loose in the vessel to the Leghorn merchants, who sorted and packed it for shipment. This custom, however, has been altered, and by getting the stone sorted at the place of production far better results have been obtained than formerly. There is no doubt but there is now less good stone to be found than used to be the case. For one ton of good light stone a miner has to have many tons of inferior quality to dispose of, and now that prices have been so interfered with by the operations of the syndicate that has been formed to acquire the working of the principal portion of the mines from the municipality, it has become a question of paying a very high price for stone we could formerly obtain for far less than it now costs.—*Chem. and Drugg.*

Piuri, or Indian Yellow.

THE following information regarding the curious East Indian dye stuff known as *piuri*, or Indian yellow, was furnished, upon the request of Prof. Graebe, of Berlin, by the India Office, on the basis of inquiries made by T. N. Mukharji in 1883 (*Journ. Soc. of Arts*, v., 32, p. 16), but seems to have remained almost entirely unknown.

Piuri is produced in Monghyr (or Mungir, chief town of a district in Bengal, between 24° 22' and 25° 49' N. L., and between 85° 40' and 86° 55' E.) from the urine of cows fed upon mango leaves. Mukharji ascertained that the only producers of the dye stuff are a sect of gwalas ("milkmen") who dwell in the suburb upon a place called Mirzapur. These people feed their cows exclusively upon mango leaves and water, which causes an increase of biliary constituents in the urine, and imparts to the latter a fine yellow color. It is asserted that the cows fed in this manner die after two years, but the piuri-makers declare this to be an untruth. Mukharji himself saw cows of six to seven years of age who had yielded piuri during four years. But these cows had a very

sickly look, and the owners stated that they had to be fed occasionally upon grass and other fodder besides mango leaves, but that mixed fodder diminishes the quantity of piuri in the urine. In consequence of the injurious effects of the mango-feeding upon the cows (the cow is a sacred animal to the Brahmanical sect of the Hindus), the piuri manufacture is confined to but few persons, and these are despised by the members of the caste.

The cows thus fed on mango leaves have the external urinary organs rubbed three or four times daily with the hand, which alone enables them to pass urine. The urine is collected during the day in small earthenware pots, and is transferred every evening into an earthen vessel, which is heated over a fire. The heat causes the separation of the yellow coloring matter. It is pressed through a piece of cloth, and the pressed matter formed to a ball, which is dried first at a charcoal fire and then by exposure to the sun. It is now ready for sale. The merchants (chiefly Marwaries), who make advances to the makers, buy the piuri at 1 rupee per pound, and take it to Calcutta and Patua. A cow usually produces 3 quarts of urine per day, which yield about 2 oz. of piuri. The yearly production is estimated at 10,000 to 16,000 lbs., which appears too high a figure.

The chemical composition of piuri was studied some years ago by Stenhouse and Erdmann, and recently again by Prof. Graebe. It was found to contain: euxanthic acid, 33 to 72 (mean 51) per cent; euxanthone, 0 to 34 per cent; silica and alumina, about 1.5 per cent; magnesium 4.2, calcium 3.4 per cent; together with water and volatile substances.—After *Liebig's Annal.*

Improvement in "Black Wash" and "Lead and Opium Wash."

F. C. HENDERSON communicated to the Dundee (Scotland) Chemists' Association the following: A change of mercurous into mercuric oxide in the lotio hydrarg. nigr., which has sometimes been remarked, he had found to be prevented in the following formula:

Calomel.....	3 i.
Glycerin.....	fl. 3 i.
Lime Water.....	q. s.

Rub the calomel with the glycerin in a mortar; transfer the mixture to a bottle; add 4 oz. of lime water, and shake well; then add sufficient lime water to make 1 pint. Where this lotion is in frequent demand the calomel and glycerin may be kept ready mixed and the lime water added as required.

Made by the customary formulæ the lotion of lead and opium presents a muddy appearance, and rapidly coats the sides of the container with a thick deposit. He therefore recommends the following:

Solution of Subacetate of Lead,	
Glycerin,	
Tincture of Opium.....	aa fl. 3 i.
Water.....	q. s.

Dilute the tincture of opium with 15 to 16 oz. of the water; mix the glycerin with the solution of subacetate of lead and add to the opium solution, and finally add enough water to make 20 oz. The product is a clear mixture which does not separate.—*B. and Col. Drug.*

Preparation of Strong Alcohol without Distillation.

THE following novel method has been devised by Conrad Schmitt for obtaining alcohol of a high percentage without distillation. While it is not likely that the method will be practically used where it is possible to employ the process of distillation, yet there may be special circumstances when distillation is impossible or undesirable, and in such cases the method may be followed, though the product will probably be suitable only for technical uses.

Assuming that a 30 per cent alcohol is available, this is first mixed with a quantity of potassa, to cause a homogeneous solution just short of separating into two layers. The solution is now shaken with petroleum ether, which extracts all fusel oil from the alcohol. For every 300 C.c. of 30 per cent alcohol (that is, for every 90 C.c. of pure alcohol), 600 C.c. of petroleum ether should be used. After the separation of the petroleum ether, a further quantity of potassa is added to the alcohol, so as to cause a separation into layers, the upper one consisting of alcohol of 94 per cent. This is separated, the small amount of potassium carbonate contained therein is neutralized with sulphuric acid, the potassium sulphate separated, and the remaining liquid decanted. This is said by the author to be pure 94 per cent alcohol.

The petroleum ether containing the fusel oil in solution is first washed with cold water, which deprives it of any alcohol it has dissolved, then with water at 50°-60° C., which takes out the fusel oil, and finally with alcohol at 50°-60° C., which removes aromatic compounds. The latter are used for compounding artificial liquors, and the petroleum ether may be used over again for purifying fresh portions of crude alcohol.—*Chem. Centralbl.*

A NEW METHOD OF DETERMINING THE MELTING POINT OF FATS.

THE determination of the melting point of fats is accompanied by many difficulties and uncertainties, chiefly owing to the almost unavoidable sources of error during the experiment. A simple inspection of the various melting points assigned by different authorities to one and the same fat will prove this. Among the methods heretofore recommended and used, the following may be mentioned here:

Bach warms the fat in a beaker and stirs it with a thermometer. As soon as the whole mass is clear, the temperature is read off (*Pharm. Centralh.*, 1883, 159).

Wimmel places a small glass tube, containing a globule of the fat, vertically in a beaker full of water, warms the latter, and notes the moment when the globule of fat is pushed upward by the water (*Pogg. Annalen*, 133, 792).

The Society of Bavarian Chemists directs to heat a capillary tube, containing the fat and sealed, in a bath of glycerin until the fat is completely transparent (Hilger, "Vereinbarungen," etc., 1885, 222).

Pohl applies the fat to the bulb of the thermometer, introduces the latter in water, warms, and notes the temperature at which the fat becomes detached and rises (*Polyt. Notizbl.*, 1855, 165).

Zaloziecki directs to introduce a little of the fat into a glass tube closed at the other end, and to pierce the globule of fat with a needle in the direction of the bore of the tube. On warming, when the fat melts, the channel made by the needle is stopped, and the expanding warm air below the globule pushes the latter out of the tube (*Chem. Zeit.*, 1888, 788).

Similar methods have been proposed by Guichard, Gross, and Beran. Damien recommends to use a disc of the fat, and to arrange it so that one side of the disc just melts while the other still remains solid (*Compt. Rend.*, 108, 1159). But this requires a too complicated apparatus.

B. Kohlmann, of Leipzig, from whose paper on this subject (in *Archiv d. Pharm.*, 1889, 828) this abstract is taken, has endeavored to avoid the usual errors inherent in the ordinary determinations of melting points. His method

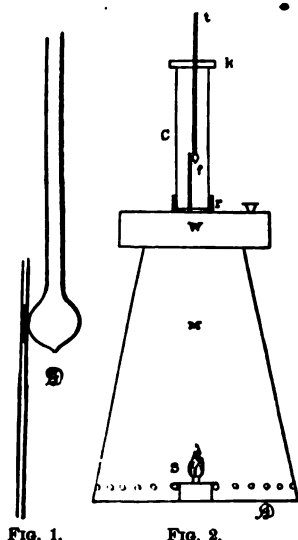


FIG. 1.

FIG. 2.

is based on the assumption that the melting point of a fat is not that temperature at which it possesses its greatest transparency (see *Zeitsch. f. anal. Chem.*, 1886, part 1), but that at which its several particles lose their cohesion sufficiently to part under a gentle pressure. This being assumed, it is only necessary to determine the exact temperature at which this occurs. This may be done in the following manner.

Supposing we had a vertically placed glass tube filled with the previously melted and then solidified fat, closed below but open above, and we were to place upon the column of fat a heavy body of such diameter as to slide easily up and down the tube. On applying a gentle heat, the fat contained near the bottom of the tube would melt first, the liquefaction would gradually extend upward, and finally the portion of fat still supporting the heavy body would melt, causing the latter to sink. This is the moment at which the temperature is to be taken.

In practice the experiment is performed as follows:

A capillary tube of very thin glass, about 1 Mm. in bore and $2\frac{1}{2}$ to 3 inches long, is filled with the fat (by suction), then put into a horizontal position, and into one end a little piece of platinum wire introduced, about 1 to 2 Mm. in length and about 0.5 Mm. in thickness, so that it just enters the column of fat. The other end of the tube is closed, after cooling.

The tube thus prepared is placed into a warm-air bath in such a manner that the point where the platinum wire is situated is in contact with the broadest part of the bulb of the thermometer. It must be remembered that the first effect of heat is to cause the column of fat to expand somewhat, whereby the platinum wire is somewhat pushed upward. Everything having been arranged (see Fig. 2), heat is applied, and as the temperature gradually increases the fat will melt in the lower part of the tube, gradually melting upward until the piece of wire is nearly reached. At this point care must be taken to observe the thermometer, and to read off the latter at the moment when the wire sinks through the fat.

The warm-air bath recommended by the author consists of a base of tinned iron, M, upon which rests a receptacle for water, W, containing in its centre a frame, r, into which the glass cylinder C may be inserted. This cylinder is closed by a disc, k, through which passes the thermometer, and f is the capillary tube. A little alcohol lamp is used for heating.

Rapid Estimation of Fat in Milk.

A. W. STOKES has devised a modification of Dr. Werner Schmid's method of rapidly determining fat in milk, which permits many samples to be examined in a short time. The method is as follows:

Into special tubes (to be obtained of Messrs. Townson & Mercer, of London), which are partly graduated up to 50 C.c., transfer 10 C.c. of the milk, if fresh, and then pour direct from its bottle some hydrochloric acid roughly to the 20 C.c. mark. If the milk is a sour sample, weigh out 10 Gm., and, with a small wash bottle containing strong HCl, wash the milk into the tube till it is full to the 20 C.c. mark, about. Now boil the mixture with frequent shaking till it turns brown. Merely heating it to the boiling point of water, by immersion in a water-bath is not sufficient. Leave for about three minutes to stand; the color will darken considerably, while thus standing, without further heat. Cool by immersion in water; fill up roughly to about the 50 C.c. mark with ether. It is not necessary that the ether should have been previously washed with water unless it contains more than 3 per cent of alcohol. Cork the tube and shake the mixture for half a minute; let settle for five minutes. Accurately pipette off 20 C.c. of the supernatant ethereal solution into a tared dish, evaporate off the ether, dry in an air-bath, and weigh the residual fat. It is advisable to take at least 20 C.c. of the ethereal solution, so as to avoid the errors of high multiplication. It is perfectly easy to pipette off accurately 20 C.c. of the ethereal solution; the presence of fat in the ether prevents the difficulty that is found in pipetting off ordinary ether. Now notice how many C.c. of ethereal solution are left in the tube. Here there is sometimes a slight difficulty, since above the sharp line that separates the brown mixture of HCl and milk from the colorless ethereal solution there sometimes floats a fluffy, narrow stratum of casein. If, however, three-quarters of this stratum be assumed to be ether, a correct reading will be made. From the whole quantity of ethereal solution originally present the percentage of fat in the milk is now calculated.

The whole process, doing at the same time a number of samples, need not take more than twenty minutes. Its accuracy is not excelled by any other process; the process is simple; the reagents are those found in every laboratory; almost all the ether and the HCl can be recovered if thought worth while; the only special apparatus needed is a cheap calibrated test tube.

The HCl and the milk in the process should not be boiled together more than two minutes, else the ether will take up a caramel-like substance. Very highly watered milks do not turn a dark brown because of the small amount of milk sugar present, while condensed and sugared milks become almost black.

An example may show the calculation required.

Ten C.c. of a milk having the spec. grav. 1.031 and giving 12 per cent by weight of total solids, when treated thus, gave, in 20 C.c. of ethereal solution, 0.277 Gm. of fat. There were left in the tube 6.5 C.c. of ethereal solution, making a total of 26.5 C.c. Then

$$\frac{0.277 \times 26.5}{2}$$

= 3.67 per cent in 100 C.c. of the milk. Dividing this by the spec. grav. 1.031, we get 3.55 per cent by weight of fat in the sample. Calculating from the spec. grav. and total solids, the fat should be 3.54 per cent.—After *Chemical News* (November 1st).

Milk Analysis.

IN the discussion of the relative merits of the different methods of milk analysis which was published in the *Analyst*, the many advantages of a simple modification of Wanklyn's method does not, I think, receive its due consideration. This modification, which I have adopted, I have already published in my annual report as milk inspector for the city of Boston, Mass., 1885, and as analyst to the Massachusetts State Board of Health in their annual report for 1886, page 138. As being now the method generally followed by most of the official milk analysts in New England, a simple description of it may be of interest to others.

The 5 Gm. of milk are weighed off in a large flat-bottom platinum capsule of full $2\frac{1}{2}$ inches diameter on the bottom and about 3 inches across the top. The $\frac{1}{4}$ -inch high side turns up from the bottom, not with a sharp angle, but slightly rounding, this being about the curve with which the milk runs up the rim of the capsule, drawn by capillarity. The milk in drying down does not thus form any thicker deposit at the angle of the side than elsewhere upon the about five square inches of bottom surface of the capsule. This relatively large amount of surface, one square inch to each Gm. of sample taken, causes each inch to be covered with only a little over a single grain of dried milk solids. The deposit is, therefore, so very thin as to be readily exhausted of its fat in its subsequent treatment with boiling petroleum naphtha. When using such small dishes as were originally proposed by Wanklyn, the residue would be so thick—that is, about three times—

as would naturally render any such rapid method of extraction as I employ impossible, as the English analysts have learned. Each capsule has its serial number engraved upon it, and they are made to weigh a little over 25 Gm. each, that the bottom may be stiff enough to remain perfectly flat—a matter of very great importance. They are also made to differ from each other only in the second and third places of decimals, so that only those weights have to be changed in many weighings, which is a matter of no little saving of labor where many score of weighings are to be made each day. A table of their weights is kept within the case of the scales. The capsules containing their samples are placed upon a constant-level, closed-top water-bath of the peculiar construction described on page 269 of the current volume of the *Journal of Analytical Chemistry*. This will hold 25 capsules at a time. Here, being surrounded by an atmosphere not already nearly saturated with moisture, as would be the case if they were upon a water-bath with openings on its top, they quickly evaporate to apparent dryness. They are then transferred, for their final drying to a constant weight, to one of Weisnegg's large porcelain-lined air-baths, regulated to the constant temperature of 105° C. Here they are dried in about half an hour, when they are cooled in a desiccator and each weighed immediately upon being taken out, to guard against their rapid gain in weight from exposure to the air. Replaced upon the closed-top water-bath, the capsule is filled from a wash bottle with petroleum naphtha of the quality of the benzine of the U. S. Pharmacopœia, revision of 1880. This, unlike ether, will dissolve out neither milk-sugar nor lactic acid from the dried milk-solid residue. Moreover, 1 gallon of it costs but as much as 1 pint of ether would, which is a matter of some little consequence to one like me, who has had to use about 100 gallons of it in milk analyses during the past five years.

The naphtha in the capsule, after being allowed to boil down about one-half, is decanted off against a rod into a basin to guard against the remote possibility of some flakes of milk residue being poured off with it. Replaced upon the bath, the capsule is refilled with naphtha. This boiling-up and decanting-off is repeated three to four times, when, after the last one, the outside of the capsule is washed off with naphtha played upon it from the wash bottle, to prevent any residue of fat being left there. The capsule, then finally replaced upon the bath to dry off the naphtha, is then cooled and weighed as before, the butter being rather determined from the loss of weight in the solids than by the weight of the evaporated washings.

The ash is made by the ignition of the capsule over a one-inch wide Bunsen lamp, which thus gives so wide a flame as not to require a heating to a high temperature at one point, and thus a possible loss by the volatilization of the potassium chloride. The milk sugar I determine by the use of a Soleil-Ventzke saccharimeter in the same manner as has now been several times described in the journals by Drs. Wiley, Vieth, and others. The other ingredients which reduce copper in Fehling's solution are not thus reckoned as sugar, by which the apparent amount of albuminoids present, which are obtained by difference, would be diminished.

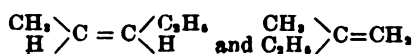
The peculiarity of my modification is, then, the use of an evaporating capsule of such a very large relative area as will leave the residue thin enough to be readily exhausted by the boiling naphtha. This a diameter of 2½ inches in the capsule will do for 5 Gm. of better than average quality of milk, with a surety that there will not be as much as one-tenth of one per cent of fat left as a maximum error. And surely this is fine enough for all commercial work, and it is much to be doubted if much which affects to be more accurate by a decimal than this is really so. The method, as involving no transfer of substance, cannot well be made more simple for the determination of total solids, fat and ash. When the average life of such an evaporating capsule under reasonable usage is considered, it cannot well be cheapened, although the outlay for a kilo of platinum for 40 capsules like mine does, it is true, involve an original expense of nearly \$400. The shape of my capsules makes possible completeness of extraction with the solvent used, and the construction of the closed water-bath hastens the process in no small degree.—Dr. BENNETT F. DAVENPORT in *Jour. Anal. Chem.*, iii., 309.

The Unification of Nomenclature in Organic Chemistry.

THE following is the text of the resolutions adopted at the International Chemical Congress recently held in Paris:

Nomenclature of the non-saturated derivatives of the fatty series.—"The letters *a* and *b* shall designate the two atoms of carbon bound together by multiple bonds in the case of bi-substituted derivatives; in the case of tri-substituted derivatives the designation may be omitted, provided the two radicals united to the same atom of carbon be named first."

For instance, the compounds



shall henceforth be known as (1) a-methyl-b-ethyl-ethylen, (2) a-methyl-ethyl-ethylen.

The same rule shall apply to bi-substituted ureas.

Nomenclature of aldehyds.—"Aldehyds shall henceforth bear the name of the corresponding alcohols, instead of the acids." Hence we shall have methylic, ethylic, and benzylic aldehyds, instead of formic, acetic, and benzoic aldehyds. A good reason for the change is that the word aldehyd is only an abbreviation for de-hydrogenated alcohol.

Nomenclature of acetones.—"In the designation of the word acetones for the word carbonyl, which is liable to misunderstanding, the term cetone shall be substituted, as it has no special meaning as yet, and corresponds to the word *ketone* used in German literature."

Consequently ordinary acetone, $\text{CH}_3-\text{CO}-\text{CH}_3$, will be called dimethylcetone instead of dimethylcarbonyl. In the same way the compound $\text{CH}_3-\text{CH}_2-\text{CO}-\text{CH}_2-\text{CH}_3$, hitherto indiscriminately called dimethylacetone and dimethylcarbonyl, will definitely be known as diethylcetone.

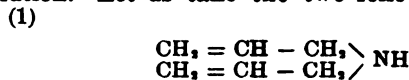
Designation of the group CN.—"The group CN shall keep the name of cyanogen when substituted to an atom of hydrogen." Hence, for instance, the compound $\text{C}_2\text{H}_5-\text{CN}$, known as ethyl cyanide or propionitrile indifferently, will henceforth bear the name of cyanethan.

Value of the termination ol.—"In the designation of hydrocarbons the termination *ol* shall be entirely discarded, and exclusively reserved for alcohols and phenols. The names of aromatic hydrocarbons shall always have the termination *en*." [Note.—In the French text this ending is spelled *ène*, which in Latin languages has for equivalent *ena* or *eno*, and in the German *en*. The last form has in this article been preferred to *ene*, which in English, owing to the absence of accents, is liable to be mistaken for *ine*.]

According to the foregoing rule, durol and naphthaline will become duren and naphthalen, and so on with others.

Fixing the value of the prefixes bi and di.—"When designating bodies formed by a duplication of the radicals, the prefix *bi* shall henceforth be employed, and *di* be kept for double substitutions. According to this convention, some names already adopted are to be gradually transformed, and diphenyl, dipropagyl, etc., for instance, shall be known as biphenyl, bipropagyl, etc."

One example will suffice to illustrate this important resolution. Let us take the two following compounds:

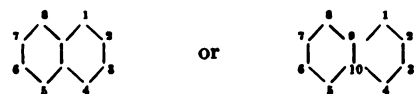


and (2)



each containing allylic groups. The first, being an amine twice substituted by allyl radical, will be called di-allylamine; the second, being an amine substituted by one group resulting from a duplication of the allyl radical, will be named bi-allylamine.

Nomenclature of complicated nuclei like naphthalen, anthracen, etc.; designation of the apexes.—Complicated nuclei are, it is known, represented by regular geometric figures. When compounds derived therefrom are to be named, it is necessary to indicate on which apex the substitution of hydrogen by a radical has taken place. Such points may be designated either by numbers or by Roman or Greek letters. The Congress has decided in favor of Arabic numbers, and adopted the following order for the principal nuclei:



Naphthalen (or naphthalin)

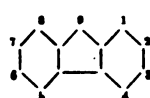


Anthracen.

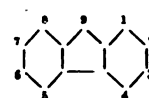
Phenanthren.

CH₃

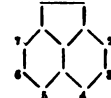
NH



Fluoren.



Carbazol.



Acenaphthen.

The programme bore also other desiderata, such as a system of notation for nitro-compounds and for nuclei containing other atoms than carbon and hydrogen, but the questions were not considered mature enough for a final decision, and were consequently referred to some future international congress or commission. It was hoped also by pharmacists that chemists, leaving aside for a moment pure theory, might think of practical concerns and take initial steps toward a simplification of nomenclature, so that currently used chemicals should have names not exceeding four or five syllables. But the

programme was already so heavy that it became impossible to consider outside questions, and the much-desired improvement was left in abeyance. It is perhaps unjust to ask or expect too much of one congress. So let this be praised for the good work it has done. If the resolutions adopted be generally accepted, as it is hoped they will be, important progress will have been secured towards uniformity in organic nomenclature, and simplicity will afterwards be more easily obtainable.—After *Chem. and Drugg.*

Uric Acid Estimation.

A SIMPLE and efficient method of estimating uric acid has been devised by Drs. Arthaud and Butte to supersede the processes generally employed, which they find either unreliable or too complicated. The reagent is to be made as follows:

Sulphate of Copper.....	1.484 Gm.
Hyposulphite of Sodium.....	20.00 "
Rochelle Salt.....	40.00 "
Distilled water	sufficient for 1 liter.

The effect of the hyposulphite is to turn the cupric into a cuprous salt, the excess of hyposulphite serving to prevent reoxidation. The Rochelle salt tends to make the reagent more stable and to hinder the formation of a sulphide. According to calculation 1.484 Gm. of the copper salt will precipitate 1 Gm. of uric acid. Hence each C.c. of the reagent will throw down 1 Mg. of the acid. The test is applied as follows: The phosphates of the urine having been separated by means of soda carbonate in excess, 20 C.c. of the filtered liquid are taken and transferred to a beaker. The reagent is now added from a graduated burette, with the usual precautions, and when the curdy, whitish precipitate ceases to form, note is taken of the quantity employed. The test will show as little as 2 Mg. in 100 C.c. of distilled water.—The Paris correspondent of the *Chem. and Drugg.*

Trichloroacetic Acid as a Reagent for Albumin in Urine.

MARSAULT and LANGUEPIN have met with urine containing albumin coagulable by heat, but in which the precipitate thus formed was redissolved by acetic acid. The same fact has been observed several times by Boymond and Patein. The former has found that Raabe's reagent for albumin in urine—viz., trichloroacetic acid—is a special precipitant of the peculiar kind of albumin under consideration. Other reagents precipitate it likewise, but this particular one has the special advantage that it does not modify the other forms of albumin. For this reason Raabe considers it preferable to nitric and to metaphosphoric acid.

It may be used either in a solid or liquid form. A crystal of it may be thrown into the test tube containing the urine, when it will dissolve and cause a turbidity or turbid zone. Or a saturated solution may be poured into a test tube and a layer of the urine placed on top, when a cloudy zone will be produced at the line of contact.

Should the urine be rich in urates, the reaction may appear without any albumin being present. But error is avoided if the urine is diluted with distilled water before making the test.—*J. de Pharm. et Chim.*

Estimation of Free Hydrochloric Acid in Gastric Juice.

THE process here described somewhat resembles that introduced by Sjöqvist (*J. Chem. Soc.*, 1889, 302), and is as follows: 10 C.c. of the fluid in which the free hydrochloric acid is to be determined are colored with a drop or two of perfectly neutral tincture of litmus. Barium carbonate absolutely free from chloride is then added until the litmus is no longer of a reddish shade, and the neutralized solution is placed in a platinum or nickel dish, evaporated to dryness, and gradually heated so as to decompose all organic acids. After cooling, the residue is exhausted with water (not more than 80 to 100 C.c. should be used) and filtered. Lastly, the barium chloride present in the solution is estimated as barium sulphate. The extreme accuracy of this method has been ascertained by using it to estimate very small known quantities of hydrochloric acid which were previously mixed with organic solutions, such as lactic, butyric, and acetic acids.—R. v. JAKSCH in *Monatsch.*, 10, 464; after *J. Chem. Soc.*

Artificial Salicylic Acid is said by Messrs. Charteris and McLennan to contain an impurity which, until it can be extracted, should prevent internal use of it or its salts of sodium. This impurity has been separated as a buff-colored powder, which is more soluble than salicylic acid and possesses poisonous properties. It is very likely a derivation of impurities contained in the phenol used in the process. It is furthermore suggested that the retarded convalescence occurring in some cases of acute rheumatism after the salicylic treatment may be owing to the prostration which this impurity causes.

Test for Minute Quantities of Nitrous Acid.

GRIES' reaction for nitrous acid by means of alpha-naphthylamine has several drawbacks. One of them is that the solution of the reagent, though originally colorless, gradually becomes dark colored and loses its sensitiveness. Another is this, that the expected color reaction (red color) appears only very slowly in highly dilute solutions (such as 1 in 1,000 million parts). Floway has improved the reaction, chiefly by substituting acetic in place of sulphuric or hydrochloric acid, and by keeping the two test solutions (one of sulphanilic and acetic acids, and the other of naphthylamine and water) separate.

Lunge has now found that it is much preferable to keep the reagent *mixed*, since any contamination, by its abstracting traces of nitrous acid from the air, will be at once indicated by the reagent itself acquiring a color (up to deep red). Moreover, should it have become thus colored, it may be readily restored as directed below. The reagent is prepared in the following manner:

I. Sulphanilic Acid.....	1 Gm.
Acetic Acid (sp. gr. 1.040).....	300 C.c.
Dissolve.	
II. Alpha-Naphthylamine.....	0.2 Gm.
Water.....	40 C.c.
Acetic Acid (1.040).....	300 C.c.

Boil the naphthylamine with the water, pour off the colorless solution from the bluish-violet residue and mix it with the acetic acid.

Now mix the two solutions and transfer it to bottles, which must be securely stopped. Access of light does no harm, but access of air might convey nitrous acid to it.

The chief objection to keeping the two solutions separate is this, that if any nitrous acid should have been accidentally absorbed from the air by either solution, a reaction for this impurity might be ascribed to the drinking water or other liquid which is being tested for nitrous acid. Whereas, if the reagent is kept mixed, and if it is free from tint when used, this is proof itself that no nitrous compound was present in the reagent.

Should the reagent become colored by absorption of nitrous acid, the latter may be destroyed and the reagent rendered colorless and fit for use again by shaking it with zinc dust and filtering in an atmosphere free from nitrous acid. The colorless filtrate reacts as well as the original test liquid.

The red color appears even in exceedingly high dilutions. In a solution of 1 part of nitrous acid in 1,000 million parts of water it appears within one minute. It is curious that in strong solutions (say 1 in 1,000) the color produced is only yellow, unless a concentrated solution of naphthylamine is used for preparing the test liquid.—After *Zeitsch. f. ang. Chem.*, 1889, 666.

Purification of Benzin.

MR. GEO. M. BERINGER recently read a paper on this subject before the Philadelphia College of Pharmacy. We take from it the following:

The U. S. Pharm. of 1880 designates as benzin that portion of the (purified) distillate of American petroleum which has a specific gravity of 0.670 to 0.675, and a boiling point of 50° to 60° C. (122° to 140° F.).

Mr. Beringer finds that a benzin answering to these requirements is exceedingly hard to obtain. Benzin of the low specific gravity required by the Pharmacopœia is usually designated gasoline. Moreover, every specimen of commercial deodorized benzin which the author examined was so contaminated with pyrogenous and sulphurous impurities that it was totally unfit for any refined purposes.

He furnishes an easy method by which benzin may be freed from these impurities. The method consists simply in oxidizing the sulphur compounds, etc., by means of permanganate of potassium. He directs this to be done in the following manner:

Mix one-half pint of sulphuric acid with 3½ pints of water, and allow to cool. Then pour it into a 2-gallon bottle and dissolve 1 av. oz. of permanganate of potassium in it. Next add 1 gallon of benzin and shake thoroughly and frequently in the course of twenty four hours. Separate the benzin and again shake it frequently in the course of several hours with a mixture of water 2 pints, caustic soda one-half av. oz., permanganate of potassium one-half oz. Then separate the benzin and wash it with water. The author thinks that the treatment with the acid permanganate solution may be shortened by an hour or two. Besides, a foul benzin may require the quantity of permanganate above indicated, while a better kind may require very much less.

When benzin thus treated is tested for offensive sulphur compounds—by boiling with ammoniacal alcohol and treatment with silver nitrate—no reaction is obtained.

When an exceptionally fine article is required, the benzin thus purified by permanganate need only be rectified by fractional distillation from lard or some other fatty substance, as recommended by Dragendorff, and that portion only collected which passes over below 45° C.—After *Am. Jour. Pharm.*

Estimation of Theine in Tea.

HILGER recommends the following plan: 10 to 20 Gm. of the sample of tea are submitted to three successive treatments with boiling water. A slight excess of basic lead acetate is added to the filtered extract, the precipitate being collected, washed, and decomposed with hydrogen sulphide. The filtered solution, from which the lead has thus been removed, is evaporated to dryness with addition of pure sand, granular marble, magnesia, or chalk. The dried mass is now thoroughly extracted with chloroform in a Soxhlet apparatus, the residue left after the evaporation of the chloroform being dried for three hours at 100° and weighed. By repeatedly crystallizing the residue from water or alcohol, it may be obtained colorless.

Waage has examined thirty-seven methods proposed or used for the determination of theine, and gives preference to the methods of Mulder, Fricke, Stahlschmidt, and the one described above, but considers Mulder's method, with some slight modifications, the best. The modified method is as follows: 10 Gm. of tea are extracted by four treatments of boiling water, taking altogether four hours' time. The filtered extract, measuring about 2 liters, is evaporated to a syrup, mixed with 2 Gm. of pure calcined magnesia and 5 Gm. of sand, and, after being thoroughly dried, is submitted to extraction with anhydrous chloroform in a Soxhlet apparatus. The chloroform is evaporated, a slightly colored residue being left which contains fatty and resinous matters. These impurities are removed by dissolving the residue in hot water and filtering; the filtrate is evaporated to dryness and weighed after being heated to 100° for two hours.

M. Hoffmann and R. Tittelbach also recommend Mulder's method, but the former considers it necessary to treat the aqueous extract with lead acetate to remove tannin and coloring matters as much as possible, precipitating the lead from the filtrate with hydrogen sulphide.—*Arch. d. Pharm. and J. Soc. Chem. Ind.*, 1889, 822.

Delicate Reaction for Rosin.

TH. MORAWSKI communicates the following very delicate reaction to recognize the presence of pine resin in paper, soap, wax, etc. (in *Mitth. d. Gewerbemuseums, Wien*).

Dissolve a small quantity of rosin (pine resin), in a dry test tube, by means of acetic anhydride ($C_2H_5O_2$; not absolute acetic acid) and a gentle heat. Cool off, and cautiously allow a drop of sulphuric acid to run down the inside of the test tube. This will cause the appearance of intensely red to bluish-violet tints, which soon disappear again, however, when the liquid assumes a brownish-red color and a distinct fluorescence.

This reaction takes place also when the quantity of resin is very small. A faint violet tint may still be observed if only 1 Mg. of rosin was dissolved in 5 C.c. of acetic anhydride.

If rosin is to be tested for in paper, the latter is cut, some acetic anhydride poured over it in a dry test tube, and heated to incipient boiling. The liquid, after cooling, is then poured into another dry test tube and the test performed therein as above directed.

Bromoform in Whooping Cough.

DR. STEPP, of Nürnberg, publishes in the *Deutsche medizinische Wochenschrift* a large number of cases of whooping cough in which he claims to have obtained most satisfactory results from the internal administration of bromoform. The drug has, according to the author, no ill effect of any kind, and his numerous observations have proved that bromoform, as applied by him, is non-poisonous, and that the pulse and temperature remain unaffected by it. The action of bromoform is entirely different from that of bromide of potassium, as has been observed in epilepsy, the former being rather an excitant than a sedative. Children are ordered from five to twenty drops during the twenty-four hours, in very frequent doses. The solubility of bromoform in water being very slight, the mixture requires the addition of alcohol. The author has administered bromoform in about sixty-five cases of whooping cough, the children mostly ranging in age from six months to seven years. The longest time required for a complete cure was four weeks. Symptoms of pulmonary catarrh in all these cases were entirely absent, or else they were very slight and soon disappeared. No complications existed in any of the cases observed by the author, but Dr. Goldschmidt has treated several serious cases of whooping cough complicated with pneumonia, completely curing them in a fortnight by the daily administration of bromoform. Dr. Stepp concludes from his observations that under bromoform treatment bronchial catarrh and lobular pneumonia do not generally occur, and that where they exist at the commencement of the treatment resolution takes place with facility and at an earlier period than under other methods of treatment. His observations showed also that the dose of bromoform must be in direct proportion to the severity of the affection and the age of the patient. The system does not seem to become accustomed to the drug, which has, moreover, considerable prophylactic power, so that the other children of a family

in which whooping cough in an advanced stage already exists can be shielded from the disease by being given bromoform. Dr. Stepp believes that bromoform is either excreted unaltered by the lungs, or is separated into its elements, and that the free bromine is excreted by the lungs. In this way an effect on the bacilli of the whooping cough could be easily supposed to result.

Concentrated Infusion of Senega.

MR. A. S. BUCK presented at a recent meeting of the Liverpool Chemists' Association a sample of concentrated infusion of senega which had a color which was not too deep, a perfect aroma and taste, which he had made by repercolation with the aid of lamp chimneys. The quantity of water used was little in excess of the volume of product, and no evaporation or heat was required. In making 1 pint, take 8 oz. of root ground to a uniform coarse powder, and distribute it through five of the glasses. This seems to be the least number that can be employed for the complete exhaustion of the drug by this process. Into No. 1 put 3 oz. of water. Any percolate collected is passed into No. 2, more water being put into No. 1, and so on, until 16½ oz. are collected from No. 5. By this time the water is passing through the marc without taste and almost colorless, the marc itself being tasteless. To the 16½ oz. add 3½ oz. rectified spirit. A precipitate is immediately thrown down, and this deposit goes on increasing for some days. Of this solid matter the author takes no notice, as he finds that upon dilution, and on the addition of but a small quantity of ammonia, a very elegant mixture is produced.—*Pharm. Journ.*

Note by Ed. Am. Drugg.—We reprint this here for the purpose of attaching a brief remark. Concentrated Infusions are preparations which are "time-savers," but have not met with much encouragement in this country. In some cases the addition of alcohol to preserve such a "concentrated infusion" will, no doubt, do no harm and merely preserve it. In others, it will precipitate a part of the active principle. On the other hand, in certain cases, an aqueous infusion is more or less inert, since the active principle may not be soluble in water, or but indifferently so.

Naregamia alata, described first by Hooker, has recently been used in the General Hospital of Vienna. The active principle of this plant has been named naregamine. It is, we are told, an alkaloid which forms crystallized salts with the various mineral acids. In addition to the alkaloid, the bark of the rhizome contains wax, gum, asparagin, starch, but no tannin.

The natives on the coast of Malabar, where the *Naregamia alata* is indigenous, employ it as an emetic, and as a remedy in bilious conditions, rheumatism, and digestive disorders. It has likewise been recommended in dysentery and in bronchial catarrh. In the General Hospital at Vienna this new remedy is employed in the form of a fluid extract, or in the form of pills or tincture. The dose of the fluid extract is stated to be from 30 to 40 drops in water flavored with laurel water.

Another product is known as Artar root (*Xanthoxylon senegalense*). In the bark of this plant no less than four alkaloids have been found, one of which, that has been named artarine, appears to be very similar to berberine in constitution; but at present we know very little about the properties of the others.—*Monthly Magazine*.

Lotion for Frost-bite.—Dissolve 3 drachms each of borax and alum in a pint of distilled water, and, after solution has been completely effected, stir in carefully 1 fl. oz. of tincture of benzoin. This is especially recommended by Liebreich.—*Monthly Magazine*.

An ointment consisting of 45 grains of camphor oil to the ounce of lanolin is also spoken of with favor.

Diuretin is the fanciful (and probably proprietary) name for a sodio-salicylic compound of theobromine, corresponding to one of the soluble salts of caffeine. It has been advanced (*Apoth. Zeitung*, December 14th) as an advantageous diuretic, acting directly on the kidneys and differing from caffeine in not affecting the nervous system and not causing wakefulness and restlessness. It is said to have produced diuresis in cases of heart and renal disease in which digitalis and strophanthus have had no effect. As the uncombined alkaloid requires 1,600 parts of water for its solution, it is not readily absorbed and causes disturbance of the stomach. It is a white powder, said to contain 50 per cent of theobromine, dissolving with the aid of heat in less than half its weight of water, and remaining in solution after the liquid has cooled. It is administered to the extent of 90 grains daily in 15-grain doses.—*Pharm. Journ.*

Chaulmugra Plants have, it seems, been successfully introduced at Réunion by the director of the Botanical Gardens. The trees are reported to be very difficult to propagate, and still more so to transplant. Hence the comparatively limited area over which they are found, notwithstanding the great medicinal value of the oil extracted from the seeds. Chaulmugra oil is probably the only known remedy that will, not cure leprosy, but alleviate it, and it is to this object that the plant owes its introduction in the Réunion Island.—*Chem. and Drugg.*

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EDITORIAL.

As the time for holding the pharmacopœial convention approaches, it is natural that suggestions should become more numerous and relate to all features of the work, from the composition of the committee to supervise the next revision to the details of publication; but it is notable and much to be regretted that, thus far, physicians seem to be devoting but little attention to the subject, and that the burden of the discussion and of proposing improvements and changes is being left to pharmacists. It is not improbable, therefore, that the convention to assemble in May will be more distinctively pharmaceutical than any which have preceded it, and it may be that the same will be true of the committee for revising the work. Considering the nature of the work to be done by the revising committee, there are some reasons why this should be so. The chief opportunity doctors can have for rendering service on such a committee, as physicians, and not on account of individual qualifications, is in deciding upon the admission or exclusion of articles to be considered. This is, however, a very limited field for usefulness as compared with questions of pharmaceutical manipulation, chemistry, and nomenclature; and with a majority of members representing pharmacy rather than therapeutics, the latter are very likely to be outvoted in the settlement of even this matter (as was the case with the present committee), unless it is definitely understood in advance that the decision with regard to the admission or exclusion of articles is to be left to the medical members.

This stage of the work having been passed, there remains little which calls for the presence of physicians, as a class, on the committee entrusted with the details of revision. Competent authorities on nomenclature, botany, pharmacy, and chemistry are much more commonly met with among pharmacists, and unless the committee should choose to delegate to the medical members the details of matters relating to finance and publication, there will remain little for them to do of an important character.

The work done by the present committee of revision towards obtaining from dispensing pharmacists in various sections of the country, reports of the relative frequency with which individual medicines are prescribed, does away, in a great degree, with the need for physicians upon

the revision committee; since it is possible, by this means, to arrive at a better estimate with regard to the demand for any particular article, than by relying upon the opinions of any available number of physicians, each of whom can, in the nature of things, express only an individual opinion, based, mostly, on his personal experience.

It would seem desirable, therefore, to develop in the future this plan for obtaining detailed reports through pharmaceutical societies, regarding the extent to which articles are prescribed, as a basis for the matter contained in the Pharmacopœia, rather than follow the custom heretofore adopted, of relying (theoretically) upon the opinions of medical members of the revision committee.

There are, however, good reasons why the presence of a reasonable proportion of medical men upon the committee should be insisted upon. So long as physicians are expected to conform in any degree to the Pharmacopœia in their prescriptions, they must share in the responsibility if not in the actual labor of its revision and publication, and when they cease to be represented on the committee they will cease to be represented in the convention, or to regard the Pharmacopœia as a work in which they have any professional interest. When this time comes doctors will have adopted, even more generally than now, the practice of designating the products of particular manufacturing pharmacists to be used in filling their prescriptions, and the condition of things which preceded the establishment of a pharmacopœia will have returned in a great degree. The acceptance of the Pharmacopœia as an authority, and confidence in its preparations, depend in so large a measure upon the co-operation of the two professions that every encouragement should be offered to physicians to participate in the work of revision. However little the majority of the medical profession may appreciate its importance, the Pharmacopœia still remains of equal value to pharmacists and physicians, and both must co-operate in it. There is imminent danger of much trouble in the future from a misapprehension of this question, and the pharmacists in the coming convention should, in their own interests, insist upon a division of responsibility in the next revising committee.

In the selection of articles which are to become official (or pharmacopœial), the decision should be in favor of a greater rather than a lesser number. It may be safely asserted that in just so far as the Pharmacopœia fails to provide standards for nomenclature, composition and strength of articles which physicians prescribe at all, does it favor the development of proprietary articles and the prescribing of products of special manufacturers. So, too, the omission from the Pharmacopœia of articles which have been official, and have had a definite composition, permits their legal sale under a well-known title, but with variable composition. Indeed, the present need of both the pharmaceutical and the medical professions is rather in the direction of amplification than diminution of the list. The fact that an article is official does not render its frequent use obligatory, nor is it even essential that every pharmacist should have it in his stock. No one thinks the less of an encyclopædia, a dictionary, or any other book of reference for facts and standards, because it contains a great many words or facts which are but rarely used or referred to; and no one has yet been so foolish as to suggest that, after the trouble has been taken to establish certain truths, meanings, or accepted definitions, because they do not happen to be in daily demand they should be expunged from current editions and their use abandoned. So it should be with the Pharmacopœia. An article once included, and standards for its composition and purity having been established, it should remain. Corrections should be made of ingredients, processes, strength, etc., as called for by the experience and understanding of subsequent revisers; but having been of sufficient importance to justify its consideration at one time, there it should stay, so that future readers may at least know what it was when it was in demand. The ignoring of this need has helped the growth of the dispensaries and decreased the demand for the Pharmacopœia until the latter has degenerated into a means for increasing the profits to be made out of the former.

To further increase the usefulness of the Pharmacopœia, every title should, after the matter at present included,

contain, in the form of subordinate notes, a description of the differences between this and the corresponding article in former editions and in other pharmacopœias; the date of its original admission, and such of its incompatibilities as are liable to produce toxic or harmful compounds, or such as are therapeutically inert.

The question of dosage is not one of *fact*, and therefore should have no place in the book, any more than that of the price to be charged for each article. Both are subject to wide variations according to circumstances. It may be that the German government requires the maximum single and daily doses to be incorporated in their pharmacopœia; but so, too, it enacts laws regulating the prices which pharmacists may charge for these articles. If we need the one, we need the other quite as much, in view of the present tendency towards price-cutting. If a pharmacist is unable to decide whether the amount of any ingredient in a prescription is excessive, or the dose directed is likely to be harmful, let him buy any one of the numerous dose books or text books on therapeutics, such as are to be found in every medical student's library, and he will possess all the necessary information on this head as well as on many others. Physicians certainly have no need for such an official declaration of what they may use, and have little sympathy with this scheme to incorporate, in a work of such an authoritative character, standards which do not exist in fact, and which may be used to their disadvantage in many ways besides in suits at law.

It has been said that the pharmacist needs some such authoritative standard for his own protection in a case where he has dispensed an unusual dose. It may also be said that in case the dose seems to him excessive according to the information contained in the usual works of reference—such as above mentioned—he has no right to dispense it at all without being assured that it is exactly what the prescriber intended, and in such a case the official posological table would be but little protection, but would help to convict him of criminal negligence if the dose was excessive and had been dispensed without the approval of the prescriber. Furthermore, it may be said that a pharmacist would be justified in declining to assume responsibility even under the latter condition, and may refuse to dispense the prescription at all.

Paul Balluff.—It is with great regret that we have to record the death, on January 8th, of Paul Balluff, for many years one of the most prominent German-American pharmacists of this city. He was born at Riedlingen, a small town of Württemberg, on January 10th, 1816. His first pharmaceutical education was imparted to him by his father, and he subsequently perfected himself by accepting engagements in various cities of Germany and Switzerland. Having completed his studies at the University of Tübingen he passed his final state examination with honors, and then became manager of a pharmacy. In 1852 he came to this country, profiting by the advice of his life-long friend and fellow-student, Mr. Gustavus Ramsperger, and opened a pharmacy in Williamsburg, which he conducted until 1865, when he became a partner in the pharmacy of J. Faber & Co. (38th street and Sixth avenue) of New York. Two years later G. Ramsperger bought out Mr. Faber, and in 1872 Mr. Balluff became sole owner, transferring the business subsequently to the corner of 37th street, where it has since remained.

Although the deceased led of late for several years a somewhat retired life, partly owing to the loss of a beloved wife and other domestic afflictions, and partly to enfeebled health, his activity and prominence in all matters relating to the profession of pharmacy and its advancement, as well as to other affairs relating to public health, charity, and scientific progress, will always be vividly in the remembrance of those who had the privilege of being acquainted with him, and still more so in that of his personal friends. The writer enjoyed this privilege for over twenty-two years, and knows that he only voices the sentiment of all who have known the deceased, that he was a man of noble and lofty aims, of spotless reputation, of energy and determination; a man who hated cant and sham, but who was a fast and true friend to those whose convictions were congenial to his.

He was one of the leading members of the German Apothecaries' Society, which he joined soon after his arrival in this country, and also of the College of Pharmacy of the City of New York, in both of which bodies he repeatedly held the office of president, as well as other offices of trust and honor. It was mainly due to his energy that the pharmacy law of 1872 was successfully passed through the Legislature. He was for many years an active member of the "Gesellig-wissenschaftlicher Verein" and of the German Hospital. He leaves a distinct void in the

circles in which he moved, and his name will always be held in honored remembrance.

Emlen Painter, President of the American Pharmaceutical Association, died on January 15th at his home at Spuyten Duyvil, N. Y. He was born in 1844 at Concord, Pa. Having been brought up and educated under the care of the Society of Friends, he commenced his professional career with Charles Shivers, of Philadelphia, attended the Philadelphia College of Pharmacy, and graduated in 1866. Next year he removed to San Francisco, where he soon rose to prominence in his profession, eventually becoming one of the founders of the California College of Pharmacy, and subsequently holding therein various offices, especially that of professor of pharmacy. In 1883 he removed to New York, where he became the owner of the pharmacy at the corner of 34th street and Sixth avenue. Though somewhat enfeebled in health, he became a most active worker in pharmaceutical and educational organizations, notably as a trustee in the College of Pharmacy of the City of New York, and as a member and officer in the American Pharmaceutical Association. He contributed largely, by extensive experiments and special studies, to the success of the National Formulary, and was the author of many valuable papers. For some years past he showed incipient signs of phthisis which gave much concern to his friends, and the insidious disease rapidly developed after his return from the annual meeting of the Association at San Francisco, so much so that he was compelled to dispose of his business and to seek relief by going to a more favorable locality. Feeling the end approaching, he returned home, where he passed away four days later, regretted by a large number of friends. His remains were taken to Darby, Pa., for interment.

Dr. Walter De F. Day, for many years Sanitary Superintendent, and for twenty-two years Professor of Botany and Materia Medica in the College of Pharmacy of the City of New York, died on November 27th last. He was born at Catskill, N. Y., in 1835, graduated at Williams College, and in 1863 at the College of Physicians and Surgeons, New York. Having served in a medical capacity during the war, and rendered very efficient service in hospital organization in the Army of the Potomac, with evidence of superior executive ability, he was appointed in 1873 as Sanitary Superintendent of New York City. Serious ill health compelled him to resign this office in the summer of last year, and only a few months thereafter he passed away. He was a member of various medical societies, and held several honorary positions, tendered to him in recognition of his worth and scientific attainments.

Toronto Dispensing Charges.—The Druggists' Association have at last agreed upon the prices which are to be taken as minima. The following are examples of the charges for mixtures:

1 oz.	20 cents.	6 oz.	50 cents.
2 "	25 "	8 "	60 "
3 "	35 "	12 "	75 "
4 "	40 "	16 "	\$1.00

The way in which the price is to be marked on prescriptions is to put down five times the charge and mark x. s. 125 below it; thus for the 2-oz. mixture

x. s.

Usefulness of Japanese Lacquer.—Mr. R. Hitchcock says that the use of Japanese lacquer deserves more general attention. "It gives a surface to wood much harder than the best copal varnish, without brittleness. It takes a polish not to be excelled, which lasts for centuries, as we may see in the old treasures of Japan. It is proof against boiling water, alcohol, and, indeed, it seems to be insoluble in every agent known. It is the best possible application for laboratory tables. I have a set of photographers' developing trays that have been in use for more than a year, and I find them excellent and cheap. In Japan it is used for many household articles."

Aqueous Solutions of Essential Oils.—It has been found by Bergmann that while mixtures of the fixed alkali soaps with hydrocarbons and essential oils form only emulsions in water, under separation of the respective oils, a mixture of an ammonia soap with an essential oil will form a clear solution in water, especially in the presence of an excess of ammonia (*Chem. Zeit.*, November 6th). Turpentine oil, or some other essential oil, is first mixed with castor oil, or a mixture of it with some other fat oil; the mixture is then subjected to the action of concentrated acid, and the product, after being washed with solution of salt, is saturated with ammonia in excess. Or the fat acids may be first separated by treatment of the fatty oil with concentrated acid, then washed with salt solution, and the essential oil added either before or after saturation with ammonia. The preparation thus obtained is said to form a clear solution, and not only to possess the properties of a soap, but also to exercise, in aqueous solution, the solvent action of an essential oil.—*Pharm. Journ.*

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,406.—Glue in Powder (G. B. E.).

We have been informed by persons who have had some experience in the glue industry that glue can be reduced to powder only during cold weather in winter time. The glue to be used for it must have been deprived of as much of its water as possible. Any of the leading dealers in paints and dye stuffs can probably furnish it.

No. 2,407.—High Specific Gravity (Chicago).

We are asked to suggest a liquid, insoluble in water, which has a specific gravity of 3 or over, and which would be suitable as a liquid in which determinations of specific gravity could be made. By inspecting the tables contained in Carnelly's well-known work, several liquids might be suggested, but we content ourselves with mentioning one, recommended by J. W. Retgers for a similar purpose, namely, methene di-iodide, CH_2I_2 , otherwise known as "methylene iodide" ("Methylenjodid," or "Jodmethylen," in German). This has a spec. grav. of 3.342 at 5° C. It is miscible with benzol, and in this way a range of spec. grav. between about 0.890 and 3.3 may be obtained.

It will be found most economical to purchase this liquid ready-prepared, as it is somewhat troublesome to make. Kahlbaum, of Berlin, quotes it at 10 marks per 100 Gm.

No. 2,408.—Bookbinder's Paste (G. F.).

Bookbinder's paste may be prepared in the following manner:

Soak 4 parts of best glue in 15 parts of cold water until it is quite soft, then melt it with a gentle heat, and add to it 65 parts of *boiling* water. In another vessel mix 30 parts of previously prepared starch paste (of the usual gelatinous consistence) carefully and uniformly with 20 parts of cold water, so as to produce a milky mixture free from lumps. Now heat the glue solution near to boiling, and pour it, under continuous stirring, into the diluted starch solution. The product will keep for some time, but may be rendered more permanent by the addition of a little carbolic acid.

It is customary, we believe, to add a small amount of alum to this paste to increase its adhesive property, as well as to aid in its preservation.

No. 2,409.—Determining Sugar in Urine by Fermentation and Specific Gravity (S. J. D.).

Roberts' method consists in determining the specific gravity of the urine at 20° C. before and after its fermentation, and multiplying the difference between the two specific gravities by 230, whereby a figure is obtained which expresses, approximately, the percentage of glucose.

Urine containing sugar has a higher specific gravity than normal urine. When the sugar has been caused to undergo fermentation, the resulting products are carbonic acid gas, alcohol, and water. The CO_2 passes off, and the residuary urine has naturally a lower specific gravity than the original urine. By numerous experiments it has been found that there is a definite ratio between the amount of sugar and the reduction of the specific gravity. If the temperature of 20° C. (68° F.) is carefully maintained while taking the two specific gravities, a close approximation to the true percentage of sugar is obtained by multiplying the difference with 230, as stated above.

Assuming we had a urine having the specific gravity of 1.0327 at 20° C. If it is not quite clear, it must be filtered. And if it does not have an acid reaction, strong solution of tartaric acid is added, in drops, until it is acid. [If small amounts of albumin are present these may be disregarded. Larger quantities are preferably removed by heating a sufficient quantity of the urine in a hermetically closed bottle immersed in boiling water, and subsequent filtering.] We now take a small piece of compressed yeast, which is best subjected to a preliminary purifying process. For this purpose it is triturated in a mortar with a little water, the latter decanted, the yeast washed by decantation with more water, and then the moist residue transferred to an ash-free filter. When it has drained, the filter is spread out on blotting paper and it may then be used at once or after partial drying. This purified yeast is now triturated with the urine, the whole transferred to a flask which is closed with a notched cork, and the flask set aside, at a temperature of 25° to 30° C. (77° to 86° F.), during twenty-four hours (at a lower temperature thirty-six to forty-eight hours may be necessary). The urine is then filtered through an ash-free filter and the specific gravity again taken at 30° C. If any difference has been found, the urine is once more treated with yeast and the specific gravity again taken after twenty-four hours. If there is a new loss, the last weight is taken to calculate the difference. Supposing after the first twenty-four hours the

specific gravity had been 1.0195, and after further twenty-four hours 1.0175, we would then say:

$$\begin{array}{r} 1.0327 \\ 1.0175 \\ \hline 0.0152 \times 230 = 3.496 \end{array}$$

that is, the urine would contain 3.496 per cent of glucose.

If it is impossible, for some reason or other, to take the specific gravity exactly at 20° C. (68° F.), then a deviation of 3 degrees either way may be compensated for by adding to the obtained specific gravity 0.0002 for every degree above 20° C., or by deducting 0.0002 for every degree below 20° C. A difference of temperature of less than half a degree may be neglected.

The specific gravity may be taken by any method which will indicate the fourth decimal. A hydrometer or urinometer will not answer for this purpose. There are only two good methods available. The best is by means of a specific-gravity bottle or pycnometer, and the next best is the specific-gravity balance (Reimann's or Westphal's).

No. 2,410.—Antifebrin (A. J. W.).

We have published numerous articles, during the last few years, giving an account of the chemistry, history, properties, etc., of antifebrin. We might refer specially to our volume for 1888, pages 3, 51, 118, 152, etc.; for 1889, 75, etc. (see index). Briefly recapitulated, the chief points of interest are the following:

Chemistry.—Antifebrin is a specially coined name for a chemical long known under the name acetanilid, the medical properties of which had been overlooked until 1887, when Drs. Cahn and Hepp, of Strassburg, discovered them.

It is prepared by heating pure aniline ($\text{C}_6\text{H}_5\text{NH}_2$) with glacial acetic acid for several days under a return-condenser, and subsequently distilling the product. At 295° C. pure acetanilid distills over, the hot distillate congealing to a crystalline mass on cooling.

Properties.—Colorless or whitish crystals or lamellæ, odorless, having a slightly burning taste, soluble in about 200 parts of cold and 18 of boiling water, and in 3.5 parts of alcohol. It is neutral to test paper.

For Tests of Purity we refer to our previous issues.

Medical Properties.—Prompt antipyretic. For this reason it was named "antifebrin," and became the first rival of antipyrine. In healthy persons it does not diminish the temperature of the body. In fever, however, it causes a lowering of temperature by several degrees. It has also been used, with moderate success, in some forms of neuralgia and rheumatism, particularly also in migraine and "katzenjammer." Sometimes it produces a cyanotic appearance.

Dose and Administration.—The average dose for adults is 4 to 15 grains. Owing to its poor solubility in water, it is best administered in warm liquids, or in a weak alcoholic menstruum, such as wine, aromatic elixir. It may also be given in powder, best triturated with some sugar or sugar of milk, or in capsules or pills.

Further information on this and other new remedies may be found in the well-known work, "Die neueren Arzneimittel," von Dr. Bernhard Fischer (fourth edition, 8vo, Berlin, 1889).

No. 2,411.—Lanolin (M. & S.).

Regarding this ointment base, we may refer to various papers published by us in former issues (volume for 1886, pages 43, 62, 77, 90, 98, 108, etc.; for 1888, pages 51, 188; a paper by C. S. Hallberg on page 148 of the issue of August, 1889, etc.). By way of a condensed summary likely to convey all the information asked for by our correspondents, we give a translation of the article on Lanolin from Beckurts and Hirsch's "Handbuch der praktischen Pharmacie" (vol. ii., page 183):

LANOLINUM.

*Adeps Lanæ. Lanolin. [Prepared] Wool Fat.**

A mixture of water and of various fatty-acid compounds of the alcohols known as cholesterolin and isocholesterolin of the formula $\text{C}_{25}\text{H}_{45}\text{O}$. It is obtained from crude suint (wool fat), a fatty secretion of sheep's wool, but, according to Liebreich, it is also contained in the fatty excretions of other keratin tissues, such as the human skin and hairs, feathers of geese, chickens, pigeons, etc. It has these advantages over other fats, that it does not become rancid, that it can take up a large quantity of water, is easily miscible with various medicaments, and is better absorbed by the skin, without causing irritation.

Lanolin is prepared, according to B. Fischer, from the crude suint, which is obtained in the wool-washing establishments by decomposing the wash water with acids, and which contains not only the fatty-acid compounds of cholesterolin and isocholesterolin, but also some 30 per cent of free fatty acids, and, besides, some odorous and colored impurities. The *modus operandi* is about the following, though it should be stated that the method of preparing

* The technical name for wool fat is *suint*, not *lanolin*. The latter is a name given to the purified product by Liebreich, who has patented the process and has a proprietary right to the name "lanolin."

pure lanolin is kept secret by the manufacturers: At first the crude suint is treated with caustic alkalis, whereby a milk is produced, which is separated, by centrifugal action, into two layers, the lower one of which contains the contaminating fatty acids in form of a soap solution, while the upper one contains the cholesterin fats emulsified by the alkali. From the latter a crude lanolin (contaminated with a calcium soap) is precipitated by calcium chloride. By remelting and washing the precipitate, a purified product is obtained, which is converted into lanolin by kneading with water. From the "centrifugal" lanolin—which has a rather dark-yellow color—pure lanolin is obtained by melting with a little caustic lime (prepared from marble), extracting the mass with acetone, distilling off the acetone from the solution, and finally incorporating 25 per cent of water by kneading. [More recently, anhydrous lanolin is put on the market.]

Lanolin (containing 25 per cent of water) is a white, unctuous, almost odorless, neutral mass, melting at about 40° C. (by warming on a water-bath), and then separating into an aqueous and a supernatant oily layer (pure lanolin). Lanolin is insoluble in water, but it takes up more than its own weight of it without losing its unctuous consistency. In alcohol it is partly soluble, and, after removal of the water by heating on a water-bath, easily soluble in ether, benzine, or acetone. Aqueous solutions of alkalis do not saponify lanolin; only by the action of alcoholic potassa at a higher temperature, or by fusing it with caustic alkali, can the substance be separated into cholesterin and fatty acids. This resistance to saponification explains the fact that lanolin does not easily become rancid. On dissolving 0.1 Gm. of lanolin in 3 to 4 C.c. of acetic anhydride, and adding concentrated sulphuric acid in drops, a rose-red tint is produced which soon passes into green or blue (this is known as Liebermann's cholestol reaction).

If 0.1 Gm. of lanolin, previously deprived of water by melting, is dissolved in 5 C.c. of chloroform, and this solution carefully poured on top of a layer of concentrated sulphuric acid contained in a test tube, a fiery brownish-red zone makes its appearance at the line of contact, and the chloroformic layer immediately above the zone shows a violet tinge (Salkowsky; Vulpus).

On drying lanolin to constant weight at 100° C., it should not lose more than 30 per cent in weight (absence of undue proportion of water). When it is heated with solution of soda, it should not give out ammonia, and when kneaded with an equal weight of water it should not assume a soapy character. A solution of 2 Gm. of lanolin in 10 C.c. of neutral ether should not be tinted by the addition of 1 drop of phenolphthalein solution (absence of alkalis), but should assume a deep red color upon addition of 1 drop of normal solution of potassa (free fatty acids). Upon ignition, lanolin should not leave more than 0.1 to 0.3 per cent of fixed residue, and this should not change the color of moistened litmus paper.

No. 2,412.—Valuation of Meat-Peptones (Chicago).

Our knowledge of the changes which albuminoids undergo when passing from the insoluble to the soluble condition, particularly when the albuminoids reacted upon are not single bodies but complex mixtures, is rather fragmentary as yet. There is no agreement among analysts either as to what products the analysis should establish as present, or as to their relative proportions, or even as to the processes by which they are to be determined. In view of this uncertainty, we cannot, perhaps, do better than give a brief outline of a method of testing peptones proposed last year by König and Kisch (in *Zeitsch. f. Anal. Chemie*, 1889, 191), which has at least the merit of establishing a few constituents with reasonable certainty and accuracy. A few preliminary remarks are first added, regarding peptones in general, from the same authors' paper.

It is usually supposed that commercial peptones are prepared by digesting albuminoids by peptic or pancreatic digestion. It appears, however, from evidence accessible to the authors, that many of these products are prepared, without digestive ferments, simply by heating natural beef, or beef deprived, by water, of extractive matters and gelatin, with or without hydrochloric acid, under strong pressure. Now, while there is still much uncertainty regarding the very nature of albuminoids and peptones proper, there certainly must be still more regarding the composition of these commercial products. For it is not likely that the meat solutions produced by heat under pressure (with or without acid) have the same value as the products of the digestion of meat by means of digestive ferments.

When the question is raised, which features are to be specially inquired into by an analytical chemist who is asked to make a comparative examination of different brands, the following points appear to the authors to be of importance and fairly well determinable:

1. Water.
2. Fat.
3. Ash.
4. Insoluble Albuminoids.

5. Coagulable Albuminoids.

6. Products of Digestion.

I. First Stage: So-called Albuminose.

7. II. Final Stage: Peptone.

These may be determined in the following manner:

1. *Water*.—Weigh accurately 10 to 20 Gm. of the peptone (according as it is more or less liquid) into a tared capsule containing sand, incorporate it thoroughly, if necessary with the help of water, and dry to a constant weight.

2. *Fat*.—Extract the residue from the first operation with ether. On evaporating the ether the fat will be left behind.

3. *Ash* [Process of Ed. AM. DRUGG.]—Into a platinum capsule containing some recently ignited asbestos-wool pour gradually a weighed quantity of the peptone. The latter must be well incorporated with the asbestos by means of a platinum wire tared with the capsule. Apply a heat sufficient to expel the water rather briskly without spattering. When a weight of peptone about equal to that of the asbestos has been added, evaporate to dryness, and then ignite very gradually and gently to avoid loss. Press the asbestos frequently against the red-hot capsule until ignition is completed. Increase of weight represents ash in peptone.

4. *Insoluble Albuminoids*.—Dissolve a weighed quantity of the peptone (5 to 10 Gm.) in water, filter through Swedish filtering paper, dry the filter, and determine nitrogen by Kjeldahl's method. Multiply the nitrogen found by 6.25. This gives the amount of insoluble albuminoids. A less accurate way is to weigh the dried filter and to regard the increase of weight as insoluble albuminoids.

5. *Coagulable Albumen*.—The filtrate obtained from the insoluble albuminoids is acidulated with a little acetic acid, then boiled, and if any flakes separate these are filtered off and nitrogen determined as under preceding paragraph.

6. Products of Digestion, etc. I. First Stage: So-called Albuminose.

Prepare a solution of the "peptone," and free it from insoluble and coagulable albumen. The quantity of "peptone" to be taken is about 5 Gm. in the case of dry peptone, 10 Gm. in that of syrupy, and 20 Gm. in that of liquid peptone. Make the solution by filtration up to 500 C.c. Take a suitable portion of this (50 to 100 C.c.), concentrate it to 10 C.c., and then mix it with 100 C.c. of a saturated solution of ammonium sulphate, cold. Collect the precipitate on a tared filter, wash with the saturated solution of ammonium sulphate, dry and weigh. Part of the excess of ammonium sulphate effloresces on the funnel. Next dissolve the contents of the filter (throwing the latter into the solution) in water to 500 C.c., and determine in an aliquot part, acidulated with hydrochloric acid, the sulphuric acid by means of chloride of barium. The barium sulphate obtained multiplied by 0.566 yields the corresponding quantity of ammonium sulphate in the portion assayed. From this the quantity in the whole 500 C.c. is easily calculated. The difference between this and the total weight of the precipitate is "albuminose."

Example: Supposing 5 Gm. of a "peptone"—deprived of insoluble and coagulable albumen—had been dissolved to 500 C.c.; 100 C.c. of this (= 1 Gm. "peptone") had been precipitated with ammonium sulphate, yielding 0.5225 Gm. of dry precipitate; this dissolved to 500 C.c., and in 100 C.c. of this the sulphuric acid assayed yielded 0.1290 Gm. BaSO₄. This multiplied by 0.566 yields 0.073 Gm. of ammonium sulphate in the 100 C.c. examined. Hence the 500 C.c. contained 0.3650 of ammonium sulphate. Hence the precipitate contained 0.5225 — 0.3650 = 0.1575 Gm. or 15.75 per cent of albuminose.

7. *II. Final Stage: Peptone*.—The solution prepared for No. 6 is used. In the case of stronger "peptones," 50 C.c. are sufficient; in weaker ones 100 C.c. may be taken. Acidulate it strongly with sulphuric acid, and add solution of phosphomolybdate of sodium [prepared, as usual, for analysis, and containing in every three volumes 1 vol. of dilute sulphuric acid (1:3)], until a precipitate is no longer produced. Collect this on a filter, wash it with dilute sulphuric acid (1:3), and determine in it, while still moist, the nitrogen by Kjeldahl's method. It should be stated here that phosphomolybdate of sodium precipitates both the albuminose and the peptone—that is, all the albuminoids in the liquid. By multiplying the quantity of nitrogen obtained by 6.25, the total albuminoids are found; and by deducting therefrom the albuminose found after § 6, the amount of peptone proper is determined.

Jumbul Seeds in Diabetes.—Dr. Graesser has published a paper on jumbul seeds, in which he develops the statement quoted recently in the *Chemist and Druggist*, that jumbul is an excellent remedy for reducing the amount of sugar in diabetes, but he states that the drug as it now appears in commerce has entirely lost its active properties, so that before it can be effectively used as a remedy some means of isolating and keeping the active principle must be found.—GERMAN CORRESPONDENT in *Chem. and Drugg.*

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[ORIGINAL COMMUNICATION.]

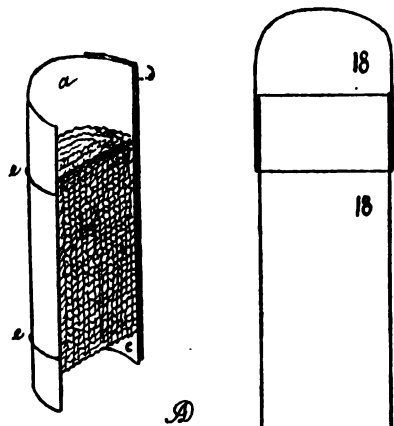
AN IMPROVED COIL FOR MILK ANALYSIS.

BY CHARLES RICE, NEW YORK.

THE advantage of employing the so-called Adams' coil (of thick blotting paper) in the estimation of milk solids, and particularly of milk fat, is generally recognized; careful trial experiments having shown that, by its use, about 0.2 per cent more of fat can be extracted from milk than by any other method.

While this fact is undisputed, there remain, however, some slight drawbacks, chiefly mechanical or manipulative, which not seldom inconvenience the operator. These drawbacks arise both from the material the coil is usually made of, and from its shape.

The coils are made of thick blotting paper, the kind generally preferred being that known as "white demy blotting, mill 428, 38 lbs." The best "Treasury" blotting paper is also used. Now, unless the coil is made rather loosely, which is accomplished sometimes by rolling up a thread with the strip of paper, it is not always easy to cause the milk to sink into the coil with sufficient rapidity. Moreover, the shape at either end is not conducive to a rapid absorption, and there is not seldom a loss from milk running down the side or escaping through a central passage.



Rice's Milk Coil and Weighing Tube.

Several modifications of Adams' coil have been proposed from time to time, one involving the use of asbestos, another that of cotton, but on trial I have found them to offer no material advantages.

A good milk coil, or cartridge, should possess the following properties:

1. It should have a shape which permits the whole amount of the milk taken for analysis (say 5 to 10 Gm.) to be applied, or poured upon it quickly, without risk of loss.

2. It should be so porous that it will readily permit the escape of water, during drying, for the estimation of solids, and afterwards readily admit the ether in the estimation of fat.

The material which I have found to answer best for this purpose is the so-called "absorbent gauze," also known as "bleached hospital gauze," used for surgical dressings. It is a light open-mesh cotton fabric, having about 40 fine shreds to the linear inch, and weighing about $1\frac{1}{4}$ av. ounces per square yard.

The milk coils, or cartridges, which I have been in the habit of using, consist of a small roll of this gauze enclosed in a wrapper of blotting paper, and their mode of preparation is as follows:

Spread out a square yard of the gauze on a flat surface, fold it twice in one direction to reduce it to 36×9 inches, then fold it upon the long side in laps of $1\frac{1}{4}$ inches in width, so that when the whole is folded it will present a strip of 1 yard in length and about $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in width, and will consist of some 18 to 20 layers.

Now begin to roll the strip up on the narrow end, like a bandage, but not too tight, until about 5 or $5\frac{1}{4}$ inches of the gauze have been rolled up; cut the strip slantingly—that is, not perpendicular to its body, but under an angle, so as not to cause "bunching" when wrapped in paper. Place the roll upon a strip of thick blotting paper 4 inches long and $2\frac{1}{4}$ inches wide, and roll the latter over it so as to have it (the paper) project at one end about one-fourth inch over the gauze coil and about three-fourths inch at the other; then tie the coil with two threads. It will thus be $2\frac{1}{4}$ inches long and about seven-eighths inch in diameter.

Fig. 1 represents a section of one of these coils, *b* being

the gauze coil, *a* and *c*, respectively, the larger and smaller free compartment, *d* is the overlap of the paper cover, and *e e* the strings.

The larger compartment (*a*) of this cartridge serves as a funnel, into which the full quantity of the milk to be tested is poured at once. A coil of this kind—intended for the smallest size of Soxhlet's extractor—will easily take from 8 to 10 Gm. of milk, and the latter will never entirely soak down to the bottom of the paper wrapper. If it should soak to the bottom of the gauze coil, this will do no harm, as it is one-fourth inch above the end of the paper.

These coils may easily be prepared in quantity, then extracted with ether, and kept in a drying oven, so as to be ready for instant use.

I am in the habit of using very light glass weighing tubes, with snugly fitting covers, each being numbered both on the body and on the cap. A cartridge, perfectly dry, is first weighed in one of these tubes, and all subsequent weighings of it are made in the same tube. The milk to be examined is weighed in a separate stoppered graduated tube, then a suitable quantity of it, judged by guess and experience—corresponding to, say, about 8 Gm.—is poured into the compartment *a* of the coil, which had previously been taken from the weighing tube. The graduated tube is weighed again, and the difference corresponds to the milk taken for analysis. The coil at once absorbs the milk, and is then transferred on a capsule to the drying oven. When dry it is weighed for determination of solids, and the fat then determined by extraction with ether in the usual manner.

The size of these cartridges may of course be varied according to the size of the extractor in which they are to be used.

I am quite certain that those who will try the gauze coils will prefer them to anything else heretofore proposed.

NEW YORK, February 12th, 1890.

INFINITIES IN PHARMACY.*

BY PROF. J. U. LLOYD, OF CINCINNATI.

[Introduction omitted.]

LET us, in the spirit of a loftier scientific inquiry, lift our eyes to the vast arch beyond us and question the silent depths of pharmacal space. The teacher and the student of pure chemistry, the student in pharmacy, the physician, the biologist, the physiologist, and the toiler in the pharmaceutical laboratory, all may unite in the scrutiny, free of interference with each other, for, as the centuries pass, its disclosures will still multiply.

To the student of pharmacy it is particularly inviting. To his exertions is due the vantage ground we now enjoy for observation. It is a common remark among self-made millionaires that the first thousand is won with greater difficulty and hardship than all the remainder. By a parity of experience we may, no doubt, prove that the hard-fought ground we now occupy may be extended a thousand-fold with comparatively little effort; nor should it be thought that I belittle the past when I contrast the insignificance of the work it has accomplished with what remains undone. In this, as in all fields of research, the pioneers are entitled to the chief honors. It is the easy task of later generations that demands of them results of a magnitude so much greater.

To the matriculate in pharmacy, listening day after day to accomplished professors, and contemplating the seemingly endless literature on the subject, it may possibly appear that no field remains for fresh explorations. With due respect to the accomplished master workmen, whom none can honor more than I, and without any desire to shatter an image or break an idol, I make bold to say that the mass of these observations magnifies the work in front of us as surely as an augmenting globe has an increasing area; and, further, that access to new territory is now easier than ever before. And let it be remembered that this area increases as the square of the distance traversed; that it is not merely a double but a fourfold obligation that rests upon us as heirs of the past.

Let us take up briefly a few of the opportunities that offer to every pharmaceutical student through which we may find our bearings for a survey of the distances that stretch before us, as well as the impediments to be encountered; for it must not be assumed that all are equally ready for the new era.

There are pharmacists who, sour over revolutions that have thrown the antiquated apothecary into the curiosity shop with his drenches and boluses, will never be comforted with anything new.

* From an address delivered before the College of Pharmacy of the City of New York, Thursday, February 20th, 1890.

Others believe that the study of pharmacy, in all respects, is for the gain that follows a mercantile business, and that there is no liberty for workers and investigators beyond the path that leads to the dollar mark; and they have ample precedent to support them.

There are also pharmacists who, models in their way, may object to comparisons that might infect a pharmaceutical student with the notion that his profession has anything to offer him but drudgery; and doubtless their personal experience has been such as in a manner to justify the objection. And yet I believe that, if we would hold our own birthright, to say nothing of enlarging the heritage of our successors, the student of to-day must be enthusiastic and must gauge his work by higher standards of success than have prevailed hitherto. The rule-of-thumb, haphazard, unsystematic searcher will be distanced by those with definite aims. There must be a thorough college education as a foundation. The student must begin his work with his feet on a level with the heads of those who delve to-day. He must lift his eyes beyond the fitful light of our feeble torches, if he is not doomed to miss the bursting of the dawn.

But a lasting truce to the spirit of cavil. With all our differences, we have common ground to stand upon and a common interest in the domain before us. And while it may be thought at first blush that before the pioneers in other sciences there lies a wider field for research than that which greets the student in pharmacy, I, for one, cannot concur in the opinion. Indeed, I shall make bold to-night to invite you to a comparison with the conditions of that science which of all others is held to be the very embodiment of infinity—into the realm of the astronomer himself.

The late R. A. Proctor, in that series of popular lectures of which "Other Worlds than Ours" was an attractive member, compared our earth with those about us, our universe with those by which it is surrounded, and carried us into the star dust of space that before the most powerful telescope shades off into the, to us, edge of astronomical infinity. And the same glowing conception had before his day burned on the canvas under the spell of the word-painter Richter's hand. Before such pictures we close our eyes that we may think in silence. But the mind wearies and the brain aches in an attempted comprehension of that endless chain where there is neither beginning nor end. The magnitude of one system is swallowed up in the immeasurable vastness of the surrounding systems, and infinity envelops all. In my laboratory, when perplexed over problems that followed problems, I have thought again and again of such revelations, and dared to imagine that a field of research as vast even as this exists in pharmacy.

In studying the fragmentary history of comets—under the instruction of Prof. Wilson, late of the Cincinnati Observatory, who has so admirably portrayed some of these erratic visitors—the magnitude of those travelling monsters as compared with things mundane, and their mysterious motions, seemed scarcely less wonderful than did their littleness contrasted with the world of space they traverse; and yet these wonders are not, perhaps, more incomprehensible than those pharmaceutical verities connected with the migration of atoms that I have ventured to place in comparison with them.

The late Prof. Carpenter, the eminent physiologist, led us, at a meeting of the Pharmaceutical Association at Niagara, into the wonderland of littleness, the beauties of physiological microscopy. The immeasurable distances spanned by the telescope are not more impassable to man than the chasm that separates us from the infinitely little revealed by the microscope. The former, stretching outward in whatever direction we may turn, leave an endless trail of ciphers behind and beggar computation; the latter reach just as far into fractional infinity, an infinity of decimals, and we draw an idea of the one by contrasting it with the other. Startling as such a comparison may be, a slight familiarity with the questions before us will soon strip it of all extravagance, and prepare us for the bold inquiry, Have we such distances in pharmacy?

Without hesitation I answer, Yes; and to me they do not yield in immensity to those in any other line of investigation whatever. Study teaches me that there is no limit to our field. It is boundless, and stretches from an unknown to an unknown. Other sciences cannot claim more. The track that leads us to the star dust is no more interminable. Infinity unfolds within infinity, and all tokens of a centre recede before our quest, as unattainable as the circumference of the astronomer's sphere.

We are met at the outset with a difficulty that not only defies penetration but baffles description. For the present purpose we may loosely define a plant as an organism evolved, under the domination of an elusive principle called life, from inorganic or disorganized materials. So far as we are able to determine, it owes its peculiar nature, its structure and properties, wholly to this quickening principle. Ignorant of the processes by which it has been differentiated from all other plants, the botanist describes and names a plant according to the structure it has assumed under the inscrutable laws of its development. The elementary substances which enter into its composition would assume, under the government of a different

plant life, a divergent structure and different properties; and, subjected to the action of natural decomposition, in either case would return to their original state. The process of growth may be arrested at any stage; the process of decomposition may be hastened or retarded. But at whatever point we may intrude in Nature's living processes, what assurance have we that the plant will surrender to the mechanical processes of the laboratory the secret of the principles which it owns solely by virtue of its life? Can the subtle alchemy by which, out of the same elements, one plant yields bread and another poison, be recorded in the barbaric language of retorts and crucibles? Are they not as far apart as the mummery of the soothsayer is from the veiled future he affects to penetrate? Painful as the admission may be, we stand dumb before the mystery of the simplest plant in its living entirety. And when we turn to its crude fragments, as gums, resins, barks, leaves, etc., we have scarcely the first clue to their true relationships. Or when at last we crush this thing of life that refuses to deliver up its secrets, and obtain from it, by certain processes, alkaloids, glucosides, oils, starches, sugars, acids, tannins, and other substances, all of which are more or less related and dependent one upon the other, yet we know not what infinity of other results is possible to other forms of manipulation.

Like the Widow Bedott's pies, which were pumpkin pies in the abstract, but in the last analysis were "principally ingredients," many a product of the laboratory masquerades under a title which can claim but the faintest relationship to its empirical constitution.

Now, while the different parts of the same plant are so divergent in their affinities, are we prepared to deny unperceived affinities in different plants? The spots on the distant sun may produce meteorological disturbances in an area of our globe that would not respond to the wildest commotions in another portion of the same globe.

But into this Holy of Holies we dare not attempt to lift the veil. Leaving its awful arcana undisturbed, we turn to consider plant remains as they come to us when the life is fled; for, as the butcher deals in flesh, not in animals, so the pharmacist deals with vegetable remains, not with the plants themselves. And even in this restricted sphere we are met with classes and distinctions that warn us back to still narrower bounds. For while we have here and there broken over the lines of separation that part the highest order of flowering plants from sedges and grasses, and then again from cryptogams with their subdivisions, it has been done in the likes of a border foray rather than in the way of peaceful occupation. They hang on the borders of our horizon like the nebulae that perplex the astronomer, and yield as slowly to our methods. We must here confine ourselves to the one class which is best known.

I speak now particularly of problems in plant structure, a mere section of the pharmacist's study; and I believe we have not only not approached, in any direction, the furthest limit of such research, but have hardly begun to blaze our way through the virgin forests. And there are few of the experienced workers in this field who will not concede thus much at least.

Only a few years back, vegetable remedies consisted of tinctures, syrups, infusions, and decoctions, or parts of plants in substance. Pharmacy then was a study of mixtures, of conglomerates. In the lifetime of men about us, most alkaloids, glucosides, and other plant constituents have been brought to light, and pharmacy has now, some would fain believe, developed into a study of definite educts and products. In the time of the very apprentices in pharmacy to-day, the greater part of the important plant principles now known have been introduced, and many of us can call to mind other educts or products that as yet are in the hands of the physiological investigator or analytical chemist, and to the world unknown. As we refer to the results of these modern investigations, all will agree that, in addition to what we have found, there is much concerning each substance to leave to future scholars. I doubt if any thorough pharmacist, whatever his accomplishments, is to-day satisfied with a single plant examination that is recorded. Is there in this world a plant that has been exhausted of its material and its connected phyto-chemical mysteries? Every page of your dispensatory is vocal with pleas for light, further light. Your Pharmacopœia has been rewritten again and again, and is now woefully imperfect. Its pages do not bear record of a single crude vegetable structure in which the inner unknown does not merge into and envelop the known; and usually there is so little of the known that the crude drug is considered as an entirety, the committee of revision not daring the attempt to mention its several constituents.

Select an example from among the vegetable drugs that have been longest recognized as therapeutical agents, and first developed in regard to proximate constituents. Naturally, opium is named (a product only), or perhaps cinchona is preferred as the more important. Each has been subjected to lifetimes of conscientious investigation, but are not talented specialists, with the focused light of all these years of investigation before them, still searching into their mysteries? Are they not severally shrouded in the mist of that pharmaceutical infinity which embraces

the domains of molecular and atomic space, those unfathomed depths of molecular motions that, under the influence of plant vitalities, produce substances which in themselves are perhaps marvels of simplicity on the one hand and of equal complexity on the other? We should not underestimate the achievements of the unremitting toilers who have freely given their lives to these investigations, men now with us and those who have gone before; but no man can be injured by comparing his work with Omnipotence, and probably I do not go beyond many when I say that the natural plant conditions of such presumably well-known alkaloids as morphine and quinine are to-day shrouded in obscurity, for some of us cannot concede that we have learned even the interstructural associations or combinations of these labor-ridden substances. Are we sure that the conditions in which any, even of the best known, alkaloids naturally exist are comprehended? Has it not been asserted recently, by a European author, that morphine—the alkaloid first discovered—exists in opium as a sulphate, and not (as has long been accepted) as a meconate? And I may perhaps venture to raise the question, Do we know that alkaloids undeniably exist in plants as the simple salts of acids, purely as direct acid compounds? Facts innumerable connected with the simplest of plant organizations, which this age may not bring to light, are surely veiled in these directions. Even our most common plant constituents are so enveloped. Owing to the lack of proper systems, we are hardly able to avail ourselves of the benefits of collated labor, which for the time being is quite as likely to add disorder as anything else to our stores. However, from such work systems will no doubt be evolved in time, and as a result we may look to see systematic plant studies opened up in what is now an unknown waste. Can it not be said, without fear of contradiction, that with each of Nature's crude vegetable productions there are unknowns in which speculations even are futile, because we have as yet no system upon which to base our speculations? While it is true that much which is of great interest and value to mankind has been developed in these directions, is it not also true that the sum of all the work so far accomplished is in such discordant condition as to make it imperative for others to labor afresh in these same fields? Do not our leaders recognize the fact even with regard to the best known drugs?

I remember to have read that a faithful student of entomology, who earned for himself a wide reputation by a lifework devoted to one, only one, class of insects (beetles, if memory serves me), in his old age remarked that the mistake of his life had been the spreading of his energies over too much territory, and he deplored the fact that he had not devoted his entire attention to the habits of one family of that genus. Such reflections perhaps are more likely to come over the workers in pharmaceutical plant research after they have passed their period of usefulness; but probably if one could follow another in the study of a single genus of plants, the magnitude of the field is such that the third and fourth generations would see good reasons to restrict themselves to still narrower confines. With due respect, therefore, to our workers of the past and present, it seems to me that elaboration of the ground already gone over in plant examination is the great and pressing demand of this day, and that this service is not of less importance to phytochemists than the mapping of the so-called known heavens is to astronomers. Our most familiar problems are involved in obscurity, and the facts necessary to their systematic correlation as an entirety seem to be as much beyond our instrumentalities as the most intractable nebula is beyond the great refractor of the Lick Observatory. Our finite minds are everywhere confronted with what is no doubt an orderly method, but recorded in a cipher we cannot read:

"A mighty maze, but not without a plan."

Are not these things true? And need we hesitate to speak them out? Need any student search for new material to work upon where conditions such as we have named are paramount? What thoughtful man will deny that, in whatever direction we may turn, our records need overhauling, even in the statements concerning qualities and descriptions of well-established single plant constituents?

As a further step in this line of thought—for I have as yet considered and referred to drugs of vegetable origin only that have been longest recognized and are best known—let us enumerate, besides the plants that men have attempted to investigate, those untouched by the chemist, and which have never been studied and are not even mentioned in our records. We find that those we have examined are so insignificant in numbers as to scarce justify mention. The little group so imperfectly known to us is counterbalanced by multitudes of species of which there are numberless varieties. The botanist is yet discovering *species*, yet formulating names; nor will this labor end during our generation. We have not even become familiar with the bare names of the plants he has recorded, and so light is his work compared with our own that he has but to grasp a flowering branch, describe the connections, relationships, and name it according to a

system, to complete his task. Comparatively, this is a small work, and yet to-day the botanist is crying in despair at the problem of species and sub-species determination, of which the American field alone presents innumerable difficulties. Before the American flora can be considered phyto-chemically, even as superficially as our work has been done to this day with a few plants, ages will have elapsed, and the names of men now foremost in the ranks will perhaps have passed from recollection. A few dozen only of American species, more or less (usually more) imperfectly, have passed under the immature methods now known to the analyst, while east of the Mississippi River alone we have doubtless ten thousand distinct flowering plants. Add to these the flora of the great West, the untold product of South America, Asia, Europe, Africa, Australia, and the islands of the seas, and we cannot but shrink before the contrast with these unexplored wilds of the little that we know. Thousands of square miles of primeval forests, dense jungles, and grassy pampas, which form blank spaces on our maps, await the tread of civilized man. These are wastes unknown to the very explorer; the botanist has not yet set foot in these voids, and we have seen how far the botanist even now outstrips the phyto-chemist. Even as I pen these words there comes (in public print) a cablegram from a man for two years lost to sight in the "Dark Continent".

"All the stretch of country between Yambuga and this place was an absolutely new country. The darkest region of the earth, it is one great, compact, remorselessly sullen forest, the growth of an untold number of ages.

(Signed) HENRY M. STANLEY."

That wilderness has closed upon and absorbed this single thread of light, yet it must be part of the conquests of the pharmacy of the future.

Regard for some of my friends, who seem to think, or at least assume, that pharmacy has passed through the stone and bronze epochs, past the iron age and into the golden era, is drawing me back; charity for myself as well lends further hesitation, for it is not pleasant to cast the life labors of one's colleagues and self behind, to vanish like a waif in the profound, and realize that a mere trifle is worthy to survive. And yet I have hardly touched the untried shore. There are deeper mysteries interlaced.

We must not overlook the fact that so far in this argument, the boundary of which is even now all beyond our horizon, I have cited plants as if each constituent derived therefrom existed as a separate entity (which is by no means the case); and we surely have more than one hundred thousand known flowering species untouched by pharmacy and by chemistry. Each of these is, as we have seen, in itself a very multiple of subjects, and of them each integral part again may resolve itself into a complexity. In studying plants we have first barks, gums, resins, leaves, roots, seeds, and other anatomical portions, and natural educts of interest—a medley of crude substances derived from the life-giving current of a single organism, each entirely distinct, and yet some of them are so dovetailed together that even in their mummified remains it is a prodigious task to tell where our study of the one ends and that of the other begins. Not only this, but these integral portions may take upon themselves different characters under different conditions, such as influences of soil and season, or even exhibit differences in properties under conditions apparently so similar that the very conditions themselves become mysteries and subjects for new study. There are also interstructural changes unexplained and recondite. For example, tobacco when a growing plant is not the tobacco of the market; a simple (?) "curing" process, that any churl thinks he can explain, adds a something to the leaf and takes a something from it; and these somethings, if examined, divide, subdivide, and increase in complexity during the "curing" process, until, like the geni in the "Arabian Nights," they severally expand into an overshadowing presence, each branching into an infinity of its own. This is true of all other drugs; and even the influences exerted by the curing process become a study, the significance of which pharmacists have not as yet grasped.

The exasperating paucity of facts in these directions is perhaps more generally recognized and regretted by those who write our books on phyto-chemistry than by those who study them. If a man were placed before a dark wedge of infinite size, his face to the edge, a feeble light from behind him would illumine its nearer portions. If the light was gradually increased, an increasing area of illumination would spread before him, beyond which an expanding area of darkness would hover, still looming in more impenetrable profundity the more the brightness grew. From each part of a plant, beginning in its very germ and continuing to its dissolution, such wedges seem to me to radiate in countless lines from every different point of view, each expanding with the unresponsive depths beyond.

It is not for us to say that throughout this seemingly trackless void no light or system rules. But no tongue has yet pronounced its "open sesame."

I would not venture to mention the connected lines of thought that often carry our visions into other expanses correlated with these. In my laboratory I have been invariably baffled and perplexed, with prelusive enthusiasm verging towards despair; and as I turn to the authorities before whom I bow, I feel that I am not alone in this sense of helplessness, for it is evident that all are sipping from the same bowl of humiliation, which is the more apparent as each new volume devoted to phyto-chemistry appears, and we find its lines but an empty frame, with here and there an added rib, rough nailed to the structure, through the coarse meshes of which we peer into vacuity. From time to time it has been my good fortune to correspond or converse with those whose names are illustrious in our profession, and the cry is ever that of eagerness for the outreaches in pharmacy. It is not "What can we find to work upon?" but "What single grain from this immeasurable storehouse shall we attempt to make our own?"

I would not in this place, as before remarked, presume to carry this train of thought further, and, leaving plant crudities, more than refer to those substances that are accepted to be proximate plant constituents, and of which the dead alkaloids seem now to be unfolding into an orderly unity and to be yielding a system. These several plant principles are evolved from defunct plants by methods of pharmacy and chemistry. They appear from the nether side of phytivorous demolition, and there is a trackless space between the living plant and these sapless, disarranged products.

But enough! Let it suffice that I have tried to lead to a realization that, wherever we may be, in the most contracted nook of this sphere, there is room for all to work. I question, and, after this all too sweeping generalization, leave my hearers to answer the question, Is the immensity of space which confronts the astronomer more impenetrable? Can it be more wonderful than the infinity that surrounds us, and need we seek in other skies than our own for mysteries to fathom? Has not enough been cited to show that we have no reason to sigh for new worlds to conquer, and that the student in pharmacy need not do homage even before those who study the heavens? Not more than the merest fragment of a single line of investigation connected with phyto-chemistry has been laid bare, but those who so desire can carry it further. Inquiry will never end, for the developments in any section that may be selected will overwhelm the investigator. As we branch out into connected, intermolecular problems that I dare not suggest as possibilities in a time to come, these conceptions become more painful, and we cover our eyes and bow our heads in reverence before the very smallest of the works of the Supreme Author, for the smallest is a growing immensity to man. Such are *Infinites in Pharmacy*.

If a Sovereign Power could bring together the accumulated knowledge of the generations in pharmacy and all connected branches to this day, and with that knowledge endue a single toiler in this field, still he would be but

"An infant crying in the night,
An infant crying for the light,
And with no language but a cry."

A Convenient and Delicate Test for Nitrous Compounds in Sulphuric Acid.

MR. JOHN HENRY WILSON points out that the usual tests for nitrous acid in presence of sulphuric, fail to be of practical use when the amount of nitrous acid is very small, as the reaction is difficult to recognize. In such cases he prefers the resorcin test. He writes as follows (*Pharm. Journ.*, January 11th):

A far better test for nitrous compounds in oil of vitriol, and one which I venture to think worthy of bringing to the notice of readers of the *Journal*, I have found in resorcin (dihydroxybenzene). It is a reagent delicate and easy of application, which gives results immediately; and, unlike the permanganate and the ferrous sulphate tests, the color produced is permanent.

If a minute quantity of resorcin, taken up on the point of a penknife, be dropped into 1 C.c. of sulphuric acid previously diluted with 5 C.c. of water, a yellow color is immediately produced if any nitrous compounds are present, which is more or less intense according to the quantity. In my hands this test has proved extremely delicate and convenient, far more so than either of the tests mentioned above, or than that recommended by Frankland, viz., the sulphanilic acid, phenol, and ammonia test.

The resorcin test can be made *quantitative* in the following easy manner: 1 C.c. of the acid to be tested is diluted with 5 C.c. of water, allowed to cool, and a minute portion of resorcin is dropped into it and stirred with a glass rod until it is dissolved. The color is noted. To 1 C.c. of pure acid, which has been proved not to give any color on the addition of resorcin, diluted as above (1 to 5), a solution of potassic nitrite of known strength is added; then a minute quantity of resorcin is dropped into it, and the color produced—after the resorcin has had time to dissolve, which only takes a few seconds—is compared

with that of the sample to which the test has been added. If it be deeper, it is only necessary to add to another portion of acid less of the potassic nitrite solution until the color produced equals that of the sample of acid under examination.

To those accustomed to work with the Nessler reagent in the estimation of ammonia in water analysis by Wanklyn's method, measuring the amount of nitrous compounds in oil of vitriol by this method will be easy enough. I use small nesslerizing glasses, 10 Cm. long and 1.5 Cm. broad, the same as recommended by Wanklyn when operating on small quantities of water.

Half a dozen of these glasses, which can be obtained of most dealers in chemical apparatus, are sufficient to work with.

Any one using this test will find it extremely easy. Besides, it is much more convenient to work with 1 C.c. of a corrosive acid like sulphuric acid than with 20 C.c.

The author next gives a practical illustration of the working of the test, and the calculation of the results:

One C.c. of a certain acid, diluted 1 to 5, was treated with resorcin, as above directed, in one of the small nesslerizing glasses placed on a white porcelain tile, and the color produced by the reaction of the nitrous compound on the resorcin noted. Into another glass containing 1 C.c. of pure sulphuric acid (diluted 1 to 5) 1 C.c. of a solution of potassium nitrite was run from a pipette, a minute quantity of resorcin added, and the color produced compared with that of the sample. In this case it was much deeper than the sample, although, as in nesslerizing, it is easy to hit the right shade in practice. To three other glasses, each containing 1 C.c. of pure acid diluted with water, smaller quantities of the potassium nitrite solution were added in the same manner. It was found that one-fifth C.c. of the nitrite solution was sufficient to produce the same tint. One-fifth of a cubic centimeter equals 0.1 Mgm. of nitrite of potassium, whence an easy calculation gives the percentage of nitrous compounds as N_2O [nitrous anhydride] or HNO_2 [nitrous acid].

Calculated as nitrous acid (HNO_2), 96 parts of nitrite of potassium (KNO_2) correspond to 47 parts of nitrous acid (HNO_2); hence 0.0001 Gm. of the nitrite corresponds (nearly) to 0.000049 Gm. of nitrous acid.

The spec. grav. of the acid under examination was found to be 1.734 at 60° F. One C.c. of the acid would weigh 1.734 Gm.

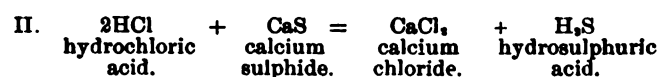
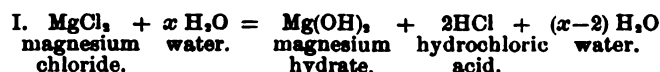
Hence $0.000049 \times 100 \div 1.734 = 0.0028$ p. c. of nitrous acid (HNO_2).

[We have preferred to write the author's figures in grammes and milligrammes rather than as fractions of the latter.—ED. AM. DR.]

It may be observed that there is nothing particularly new in the reaction which takes place when nitrous compounds are added to resorcin. It is made use of in the synthesis of different dyes, and the reaction is familiar enough to those who have practically studied the chemistry of the benzene derivatives. Besides yielding dyes with nitrous acid, resorcin, when heated with phthalic anhydride, is converted into fluorescein. . . . It was the above-mentioned reaction that led me to try it as a test for nitrous compounds in oil of vitriol, and I think it will be found equally convenient for testing spirit of nitre, and for estimating the amount of nitrous ether contained in it. It will be far easier to estimate the ethyl nitrite with resorcin than by the usual method involving the use of a nitrometer, which every pharmacist does not possess.

I venture to think that resorcin will be found a useful test to those who have occasion to examine sulphuric acid for aerated-water manufacturers and others. Besides, there are many compounds, in the production of which sulphuric acid is used, where the presence of nitrous compounds is objectionable and in some cases inadmissible. In these cases the resorcin test will be found specially useful. [The test is of no use for nitrates; hence we have avoided using the term "nitrogen compounds," here and there used by the author, and have substituted "nitrous compounds" in place of it.—ED. AM. DRUGG.]

Preparation of Absolutely Pure Hydrosulphuric Acid.—In a flask provided with a safety tube, mix 1 part of sulphide of calcium and 2 parts of chloride of magnesium, with enough water to make a thin magma, and connect the flask with a wash bottle containing distilled water. On heating the flask, hydrosulphuric acid is given off in accordance with the following reaction:



Since the reaction mentioned under I. takes place only when the liquid is heated, the evolution of hydrosulphuric acid ceases when the source of heat is withdrawn.—J. HABERMANN in *Chem. Zeit.*

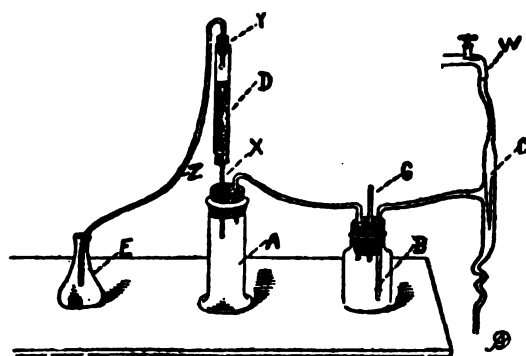
A GENERAL METHOD FOR DETERMINING THE EXTRACTIVE IN CRUDE DRUGS.

MR. A. L. JOHNSON gives the following directions for readily determining the extractive matters in crude drugs, in a recent issue of the *Druggists' Bulletin*:

D is a piece of inch-bore glass tubing, 7 or 8 inches long, which contains the drug to be exhausted, and is connected by the glass tube X with the graduated receiving bottle A. C represents the suction apparatus attached to the water tap W, and may consist of a Bunsen or Sprengel's air pump, or any other convenient form of aspirator. B serves both as a safety bottle to intercept the back flow of water at times of varying pressure, and as a point of attachment for duplicates of the apparatus A—D when it is desirable to have them. To this end, the stopper should be fitted with suitable tubes and caps (G).

The *modus operandi* of the apparatus, as will readily be anticipated, rests on the exhaustion of the air from A, to replace which the menstruum from E is drawn up the rubber tube Z, and thence down through the closely packed drug in D to the receiver below.

The operation itself may be described as follows:



A dozen or more of the glass cylinders D, the number to suit the requirements of the operator, are provided with tightly fitting corks. Ten Gm. of the drug, in a state of fine powder, are transferred to one of these cylinders, a cork having been previously inserted. About 30 C.c. of the proper menstruum are then measured in, the second cork inserted tightly, and the cylinder given a thorough shaking. The drug in this condition is allowed to macerate, with occasional agitation, until it is thoroughly saturated. This point may be reached most readily and quickly by placing the tightly corked cylinders in the sand tray of a steam bath where they will be subject to a moderate heat.

When the maceration is thus completed, the corks are removed one at a time, and tufts of absorbent cotton placed in either end of the cylinder. Now one of the corks is replaced by the perforated stopper carrying the tube X, which latter is at once inserted in the stopper of the receiving bottle A, as shown in the cut. Having made all the joints tight (only rubber stoppers should be used), the aspirator is started and the liquid used in maceration is completely drawn from the drug, which, now nearly dry, is pressed as tightly as possible in the cylinder. The stopper Y is then inserted, and the apparatus allowed to feed itself until exhaustion is complete or the required amount of menstruum (100 C.c.) has passed through the drug. Of the tincture thus formed, 10 C.c. are evaporated to a constant weight at 105° C., and the residue calculated as the extractive in 1 Gm. of drug.

This method has been applied with success in the extraction of aconite and conium leaves, and golden seal, when a 50 per cent alcoholic menstruum was taken. Rhubarb, henbane, stramonium, and belladonna leaves were satisfactorily exhausted with 66 per cent alcohol, and the same may be said of aconite, hellebore, and cannabis indica, when 94 per cent alcohol was employed.

With some of these drugs the complete operation of estimating the extractive was performed by this method in less than 48 hours—a result not readily attained by percolation.

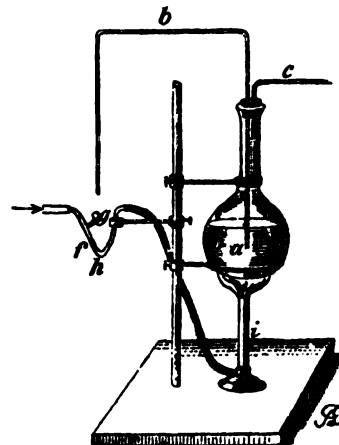
Hydrosilico- and Hydroboro-fluorio Acids as Antiferments.—Mr. F. J. Homeyer, of Frankfurt-on-the-Main, announces (in *Pharm. Zeit.*, 1889, Dec. 14th) that he has found both hydrosilicofluoric and hydroboro-fluoric acids to possess decided antifermentative properties. On adding 0.1 to 0.5 per cent of hydrosilicofluoride of calcium, or of a soluble salt of hydroboro-fluoric acid, to a solution containing 10 per cent of glucose and 5 per cent of yeast, neither fermentation nor any other change takes place. Grape juice mixed with 0.2 per cent of the calcium salt behaves in the same manner.

Starch paste treated thus likewise remains unaltered. The author proposes to study the action of these acids more in detail, and promises further report.

AUTOMATIC CUT-OFF FOR GAS.

THE automatic cut-off for gas here described is intended, primarily, for operations where the moment when the supply of gas is to be stopped can be determined by the rate at which a liquid evaporates. For instance, the flask *a* having been partly filled with water, it will be easy to determine, experimentally, about how much time will be required to cause the water contained in it to boil down to any given depth by the full flame afforded by the burner *i*. Supposing it has been ascertained that from the level at which the water stands in the cut, down to the orifice of the inner leg of the tube *b*, one hour's boiling is sufficient. This, then, will be the time required to dissipate that much liquid by boiling. And in a similar manner other periods of time may be fixed by experiment.

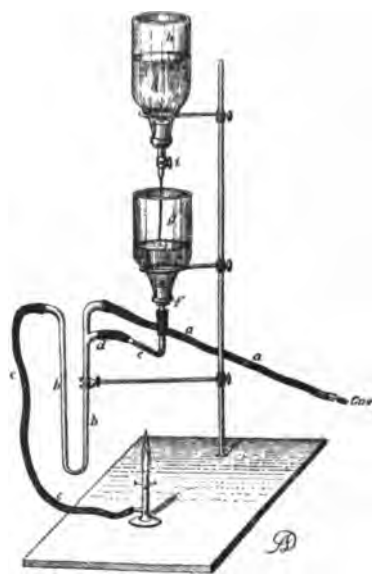
Now the designer of the apparatus, Felix Bauer, proposes to use it for shutting off the supply of gas to its own burner. As long as the inner leg of *b* is below the surface of the liquid the steam will escape through *c*. When the orifice of the inner leg of *b*, however, becomes exposed, steam will also pass through the whole tube *b*, and at its outer orifice will play upon a small expansion of a V-shaped glass joint in the gas supply, containing a little mercury and a few drops of ether in a trap. The steam playing upon the ether causes this to develop vapor under pressure; this projects the mercury into the V-shaped tube, where it stops up the capillary channel at *h*, thus shutting off the supply of gas. —After *Chem. Centralbl.* (from *Chem. Zeit.*).



Note by Ed. Am. Drugg.—The apparatus may also be used for shutting off a supply of gas conducted to other apparatus, besides its own supply. For this purpose it is only necessary to have another twice-bent tube, similar to *b*, which is not quite as deeply pushed down into the contents of the flask as *b*. The outer leg of this extra tube is adjusted, just as shown in the cut, over a mercury trap in the gas conduit leading to the other apparatus, which it will cut off at the proper time. A little later the tube *b* will come into action, and shut off the gas supply of the flask *a*.

Another cut-off, in which the time required for a given volume of water to flow off in drops is the means of adjusting the moment of interrupting the gas supply, is proposed by Luzi. The apparatus is easily intelligible from the cut. It may be stated that *g* and *h* are two plain bottles with bottom cut off, and *i* is a glass stop-cock fitted into the stopper of *h*. At *d* a lateral tube is attached, the portion at *e* being quite narrow and having a drop of mercury placed in the bend. The tube *b* is preferably made quite long, so that it may be large enough to hold the liquid which will be driven into it at the decisive moment.

The drop of mercury in the bend of the tube *e* evidently requires a given force to be projected forward through the capillary tube. This force is equal to a certain weight of water, which may easily be ascertained by experiment. And at the same time it may be ascertained how long a time is required, at a certain position of the stop-cock *i*, until the amount of water required to push forward the drop of mercury has collected in the vessel *g*. Supposing it is ascertained that it takes just 1 quart of water to project the drop of mercury, then it is within the choice of the operator how long a time he will give that quart of water to drop into the vessel *g*. Of course he will have to determine this time by experiment. —After *Chem. Centralbl.*



Novel Show Bottle.—A Liverpool apothecary has substituted a glass percolator and receiver for the usual show bottle, filling the upper part of the percolator with a red solution and the receiver with a blue one, the gas jet being placed behind in the usual manner.

USE OF THE NITROMETER FOR ASSAYING VARIOUS CHEMICALS.

WE have repeatedly described the so-called nitrometer and its application in the quantitative analysis of urea, spirit of nitre, and other chemical substances (see, for instance, our vol. for 1889, p. 63; 1888, 155, etc.). Prof. G. Lunge, to whom most of the credit connected with this method is due, has recently made further contributions to its practical application, particularly in the assay of chlorinated lime, manganese dioxide, and potassium permanganate.

We must, of course, assume that the nitrometer, in its usual form, is known to the reader. Those who lack this knowledge ought to consult our volume for 1888, 155, and particularly 1886, page 71. The apparatus described in the last-named article is here again illustrated for the sake of rendering the subsequent explanation more intelligible (see Fig. 4).

Prof. Lunge's recent paper first treats of the relative degree of accuracy attainable by the nitrometer method. He communicates results regarding the assay of the three substances above mentioned.

1. *Chlorinated Lime.*—This is estimated by means of peroxide of hydrogen, which must for this purpose be rendered alkaline by the addition of solution of soda. It is not necessary to be very exact in this addition. It may be added until a flocculent precipitate begins to appear, but too large an excess must be avoided. Each separate portion of the peroxide must be thus rendered alkaline before use, and the peroxide itself must not be too concentrated. A strong peroxide (say over 5 Gm. H_2O_2 in 100 C.c.) produces results which are a little too high. The best strength is 2 Gm. of H_2O_2 in 100 C.c., or even less.

Lunge's process has the additional advantage that the strength of the peroxide itself may be easily determined within a few minutes by decomposing a measured quantity of it in the nitrometer with an excess of chlorinated lime of any (although unknown) strength. If 1 C.c. of the peroxide gives off not more than 7 C.c. of oxygen—half of which, of course, is due to the chlorinated lime, according to the equation, $H_2O_2 + CaOCl_2 = H_2O + CaCl_2 + O_2$ —then the peroxide is about of the right strength. While too great a strength of the peroxide must be avoided, it makes no difference if the peroxide (if of proper strength) is used in excess—for instance, if 10 C.c. are used instead of 7 C.c. The only necessary condition is that it shall not be too concentrated nor too alkaline.

An important point to be observed is not to delay any longer than necessary in taking the reading of the scale, since the undecomposed peroxide of hydrogen itself will gradually evolve oxygen.

In estimating chlorinated lime, it has been ascertained that the nitrometer method may be applied both to clear and to still turbid solutions without producing error.

In making the estimations described by the author, the latter recommends to use simply water as tampon instead of mercury, since the gas or gases evolved are just as feebly soluble in the former as they are in the latter.

While any of the various forms of nitrometer may be employed for these assays, the author gives some practical hints which render the choice of one or the other form preferable in certain cases. Probably the form shown in Fig. 1 is the one most universally applicable. In this the decomposition of the reacting substances may either be accomplished within the measuring tube (a) itself, or it may be brought about in the attached bottle b, the bore of the glass stop-cock being so arranged that communication can only be established with either c or b at one and the same time. In many cases there is no need of the cup-shaped attachment c (of Fig. 1). In such cases the forms

shown in Figs. 2 and 3 are suitable. It will be noticed that in one of these new forms the graduation does not begin with the stop-cock itself, but a little below it (0). This is for the reason that it is more easy to adjust the level of the tampon liquid to the mark 0, which is clearly seen, than to the exact bottom of the stop-cock, which it is sometimes hard to distinguish.

In Fig. 3, a bulb interposed between the stop-cock and the measuring tube proper permits the measurement of a rather large volume of gas.

Assuming we had to make an assay with the apparatus shown in Fig. 1. First the two tubes (see Fig. 4) are filled with water until the latter reaches the mark 0 in the tube a (c in Fig. 4), when the two tubes are so adjusted that the water in both stands on the same level. Then the stop-cock is closed. Next a sufficient quantity of peroxide of hydrogen is poured into the small tube e (Fig. 1; f in Fig. 4), and the exactly measured quantity of chlorinated-lime solution into the bottle b, outside of the tube e. When manganese dioxide is to be estimated, this is likewise put into this place. The stopper f is now inserted, and, by careful adjustment of it, the level of the liquid in the measuring tube (which had been depressed on first inserting the stopper) exactly readjusted at the mark 0. Care must be taken, throughout the operation, not to touch the bottle b more than necessary with the hand, in order to avoid warming and expanding the contents.

When it is ascertained that the level of the liquid in the two tubes remains constant, the faucet is opened so as to bring the bottle in communication with the nitrometer, and once more it will be necessary to see that the former level is preserved or restored. By inclining the bottle b, the peroxide is made to flow from the tube e upon the chlorinated-lime solution (or other substance to be acted upon), and will develop gas which displaces liquid in the graduated tube. Previously, however, it is necessary to lower the compensation (or ungraduated) tube (see Fig. 4), so as to avoid the production of any pressure. When no more gas is given off, the two tubes are readjusted until the liquid in both is at the same level, and the space displaced in the graduated tube at once read off. If care has been taken not to warm any part of the apparatus by contact with the hands, there is no need of waiting. In fact, waiting is apt to vitiate the results. If the latter are required to be accurate, it is necessary to take into consideration both the thermometer and the barometer. These may, however, be avoided if another nitrometer is at hand which had previously been charged with a certain quantity of reagents which had given off a known volume of gas. The expansion or contraction of the latter, under varying conditions of temperature or pressure, affords a ready method of correcting the results obtained upon unknown material.

When operating upon chlorinated lime, it is best to arrange the proportions so that the result at once indicates the percentage of available chlorine. For this purpose, 20 Gm. of chlorinated lime are dissolved in water to make 500 C.c. Each cubic centimeter of oxygen developed, after reduction to $0^\circ C.$ and 760 Mm., will then be = 0.003167 Gm. (or 0.3167 per cent) of chlorine. If 25 C.c. of this (corresponding to 1 Gm. of chlorinated lime) are taken, a bulb nitrometer graduated to 140 C.c. must be employed. If one graduated only to 50 C.c. is available, only 5 C.c. of the above solution must be taken, in which case, of course, each cubic centimeter of oxygen corresponds to 5×0.3167 Gm. or 1.58 per cent of chlorine. Still more convenient will it be to dissolve 7.917 Gm. of chlorinated lime in 250 C.c. of water, and to use for each test 10 C.c. of the turbid liquid. Each cubic centimeter of oxygen corresponds then to 1 per cent of available chlorine. A 50 C.c. tube is sufficient for this purpose.

2. *Manganese Dioxide.*—In estimating this, it must be reduced to the finest possible powder and put into the bot-

FIG. 1.



FIG. 2.

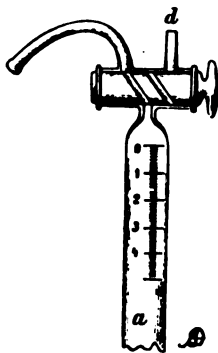


FIG. 3.

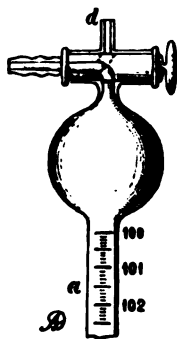
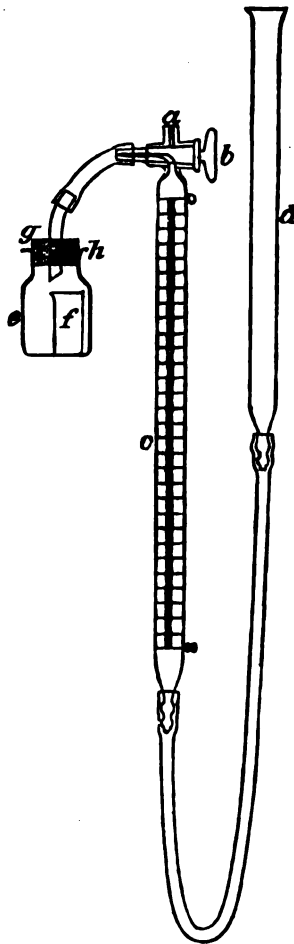
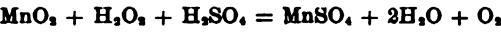


FIG. 4.



the b, outside of the tube e. Before the latter is placed in, some dilute sulphuric acid is poured on the oxide and well agitated with it to decompose any carbonates that may be present. In this case the reaction takes place in acid solution:



Since only one-half of the oxygen is derived from the peroxide, each cubic centimeter of oxygen corresponds to 0.003897 Gm. of manganese dioxide. Therefore, if 0.3897 Gm. of the dioxide are weighed out for each test, the number of cubic centimeters of oxygen given off will at once indicate the true percentage of pure MnO2.

3. Potassium Permanganate.—It is often necessary to determine the titer of a volumetric solution of the salt, since it cannot be kept long without change. This may be rapidly done by means of peroxide of hydrogen in presence of a rather large quantity of free sulphuric acid. The oxygen given off consists of the whole that is available for oxidation both from the permanganate and the peroxide.

Prof. Lunge adds a remark to his paper which deserves general attention, as it implies a lesson often neglected. He says: "It is scarcely necessary to say that this, like any other analytical method, requires a certain amount of practice, if absolutely reliable results are expected. If any one should suppose that he should obtain perfectly correct results at the very first trial, perhaps with an untested nitrometer and other unverified measures, and in a room subject to changes of temperature, he will find himself deceived, but not any more so than would have been the case had he practised other analytical methods heretofore unfamiliar to him."—After Zeitschr. f. angew. Chem.

[ORIGINAL COMMUNICATION.]

UREA TABLE.

SINCE the estimation of urea in urine by means of Lunge's nitrometer has become a comparatively simple operation, occupying, after a brief practice, not more than about ten minutes, and as a number of physicians are now in the habit of making such determinations for purposes of diagnosis and treatment, it has been suggested to us that, if a table were constructed, reducing the amount of calculation to be performed by the physician to a minimum, the method would be still more used by the profession at large. In compliance with this suggestion, we present the following table, which is made, not for scientific, but for practical purposes, and regarding which the remarks here appended should be carefully noted.

1. It is presumed that the reader or operator is familiar with the method of decomposing urea by a hypobromite, whereby it is converted into nitrogen, carbonic acid, and water, the nitrogen being evolved as gas which is subsequently measured, while the carbonic acid is absorbed by the caustic alkali of the reagent. Those not familiar with the operation are referred to the AMERICAN DRUGGIST, 1889, page 63, and works on urinary analysis.

2. Perfectly correct results are obtained only under certain conditions, which are often beyond the control or facilities of the physician.

3. The theoretical formula for calculating the weight, in grammes, of urea from the volume of nitrogen evolved is as follows:

v (b - b') / 354.3 x 760 (1 + 0.003655 t) h

in which

- h is the weight of urea in grammes;
- v is the volume of the evolved nitrogen;
- t is the temperature in centigrade degrees;
- b is the barometric pressure in millimeters;
- b' is the tension of aqueous vapor at the temperature t.

The figures for b' are generally given in form of a table comprising the usual temperatures at which such determinations are made. This table will be found in all treatises on gas analysis.

If the barometric pressure and tension of aqueous vapor be disregarded—which may be done without much error in any locality near the sea level—and if the volume of evolved gas be read off at 15° C. (59° F.), or as near to it as possible, then the above formula becomes:

v / 354.3 x [1 + (0.003655 x 15)]

Now, by substituting 1 (that is, 1 C.c.) for v, and calculating the value of the fraction, we obtain 0.0027, which is the weight, in grammes, of 1 C.c. of nitrogen gas evolved under normal conditions.

4. The table below given is based upon this figure, and upon the assumption that normal conditions of temperature and barometric pressure prevail.

5. The whole of the nitrogen in the urea is never shown by the reaction, because a small quantity of nitrogen remains dissolved in the liquid. But the error may be disregarded if the liquid which is tested contains less than 1 per cent of urea; and even up to near 1.5 per cent it is not of material amount,

6. The more urea a urine contains the less accurate become the results of the assay, unless it is diluted so as to contain about 1 per cent of urea.

7. It is, therefore, best, when some accuracy is required, to obtain an approximate idea of the amount of urea by a preliminary assay, then to dilute the urine so that it will contain from 0.5 to 1 per cent of urea, and to repeat the test.

8. If daily or periodical examinations of the urine of one and the same person are undertaken, the preliminary assay may be omitted. All the results will be affected with an error, but this will run uniformly through the series, and will not prevent any decrease or increase of urea from being readily recognized.

N. B.—As the quantity of urea likely to be encountered in any urine does not go below 0.8 per cent nor beyond 6 per cent, all figures corresponding to values outside of these limits have been omitted from the table.

The three columns giving the number of grammes of urea in 100 C.c. may also be utilized to calculate the percentage of urea per weight. For this purpose it is only necessary to take the specific gravity of the urine, and to divide with it the number of grammes given in the table. For instance, supposing 2.5 C.c. of urine should have evolved 18 C.c. of nitrogen, then we find from the table that 100 C.c. of the urine contained 1.944 Gm. of urea. If the true percentage is wanted, supposing the urine has a specific gravity of 1.030, we divide 1.944 by 1.030 and obtain 1.887.

UREA TABLE.

C.c. of nitrogen evolved.	Amount of Urine taken for Analysis.					
	1 C.c.		2.5 C.c.		5 C.c.	
	Correspond to urea in 100 C.c. in 1 fl. oz. of urine.		Correspond to urea in 100 C.c. in 1 fl. oz. of urine.		Correspond to urea in 100 C.c. in 1 fl. oz. of urine.	
5	1.85 Gm.	6.5 Gr.	—	—	—	—
6	1.62 "	7.86 "	—	—	—	—
7	1.89 "	8.61 "	—	—	—	—
8	2.16 "	9.84 "	0.864 Gm.	3.986 Gr.	—	—
9	2.43 "	11.07 "	0.972 "	4.438 "	—	—
10	2.70 "	12.3 "	1.080 "	4.920 "	—	—
11	2.97 "	13.53 "	1.188 "	5.412 "	—	—
12	3.24 "	14.76 "	1.296 "	5.904 "	—	—
13	3.51 "	15.99 "	1.404 "	6.396 "	—	—
14	3.78 "	17.22 "	1.512 "	6.888 "	—	—
15	4.05 "	18.45 "	1.620 "	7.380 "	0.810 Gm.	3.690 Gr.
16	4.32 "	19.68 "	1.728 "	7.872 "	0.864 "	3.936 "
17	4.59 "	20.91 "	1.836 "	8.364 "	0.918 "	4.182 "
18	4.86 "	22.14 "	1.944 "	8.856 "	0.972 "	4.428 "
19	5.13 "	23.37 "	2.052 "	9.348 "	1.026 "	4.674 "
20	5.40 "	24.6 "	2.160 "	9.840 "	1.08 "	4.920 "
21	5.67 "	25.83 "	2.268 "	10.332 "	1.134 "	5.166 "
22	5.94 "	27.06 "	2.376 "	10.824 "	1.188 "	5.412 "
23	—	—	2.484 "	11.316 "	1.242 "	5.658 "
24	—	—	2.592 "	11.808 "	1.296 "	5.904 "
25	—	—	2.7 "	12.3 "	1.35 "	6.150 "
26	—	—	2.808 "	12.792 "	1.404 "	6.396 "
27	—	—	2.916 "	13.284 "	1.458 "	6.642 "
28	—	—	3.024 "	13.776 "	1.512 "	6.888 "
29	—	—	3.132 "	14.268 "	1.566 "	7.134 "
30	—	—	3.24 "	14.760 "	1.62 "	7.380 "
31	—	—	3.348 "	15.252 "	1.674 "	7.626 "
32	—	—	3.456 "	15.744 "	1.728 "	7.872 "
33	—	—	3.564 "	16.236 "	1.782 "	7.618 "
34	—	—	3.672 "	16.728 "	1.836 "	8.364 "
35	—	—	3.780 "	17.220 "	1.890 "	8.610 "
36	—	—	3.888 "	17.712 "	1.944 "	8.856 "
37	—	—	3.996 "	18.204 "	1.998 "	9.102 "
38	—	—	4.104 "	18.696 "	2.052 "	9.348 "
39	—	—	4.212 "	19.188 "	2.106 "	9.594 "
40	—	—	4.320 "	19.680 "	2.160 "	9.840 "
41	—	—	4.428 "	20.172 "	2.214 "	10.086 "
42	—	—	4.536 "	20.664 "	2.268 "	10.332 "
43	—	—	4.644 "	21.156 "	2.322 "	10.578 "
44	—	—	4.752 "	21.648 "	2.376 "	10.824 "
45	—	—	4.860 "	22.140 "	2.430 "	11.070 "
46	—	—	4.968 "	22.632 "	2.484 "	11.816 "
47	—	—	5.076 "	23.124 "	2.538 "	11.562 "
48	—	—	5.184 "	23.616 "	2.592 "	11.808 "
49	—	—	5.292 "	24.108 "	2.646 "	12.054 "
50	—	—	5.3 "	24.600 "	2.650 "	12.300 "

"Gm." = Gramme; "Gr." = Grain.

Quinoline as a Preservative.—At the Erlangen Physiological Laboratory the following formula is adopted: Quinoline, 5 Gm.; sodium chloride, 6 Gm.; glycerin, 100 Gm.; water, 900 Gm. Ordinary tar quinoline can be used. The liquid is said to have the property of preserving all the tissues in their natural condition, excepting the removal of all coloring matter.

Quinoline is also said to be a convenient preservative for digestive liquids; an addition of the salicylate, while preventing putrefaction, does not interfere with the activity of the digestive ferments.—Pharm. Journ.

Glyco-Gelatin.

At a recent pharmaceutical meeting held at Liverpool, Mr. T. S. Wokes read a paper on "Glyco-gelatin," which is the name given to a compound used in the throat hospitals for preparing medicated pastilles. Following is a portion of the paper (after *Pharm. Journ.*):

The term "glyco-gelatin" is the name given in the Throat Hospital Pharmacopœia to the bases there ordered for making their official pastilles.

For the purposes of this paper I propose to apply the term glyco-gelatin [we have changed the author's spelling of "glycerine" and "gelatine" to "glycerin" and "gelatin."—ED. AM. DRUG.] more generally to other combinations containing glycerin and gelatin (with water) than the T. H. formula, which is:

Refined Gelatin.....	3 i.
Glycerin (by weight)	3 iiss.
Orange Flower Water.....	3 iiss.
Sol. Carmine.....	q. s.

The gelatin is soaked in the water for two hours, then heated in a covered water-bath until dissolved, the glycerin added, the two stirred well together, and the whole strained through muslin. Wring out in hot water, and when sufficiently cooled the coloring is added.

It is easy to make, taking (including the two hours' soaking) about two and one-half hours, and possesses good keeping properties. I have had samples over twelve months, and they were then still fresh and nice.

To convert this into pastilles, cut off 3 i., melt in a small water-bath, add the medicament, previously rubbed up with a few drops of glycerin, and pour into an oiled tray, and when cold divide into twenty-four pastilles. The tray which I use is the lid of an ordinary 4-ounce tin lozenge box, and also, to insure reasonable accuracy in the cutting, I use a piece of card, on the surface of which there are the outlines of the exact size of the sheet of pastilles when turned out of the mould. On the outside of these lines there are short lines dividing it into the required number of pastilles. I use an ordinary table knife for cutting.

There are other methods of cutting the pastilles.

Mr. Wyatt recommends and uses a square tin mould 3x3 inches, divided into squares by means of deeply impressed lines on the under surface.

Another method is given in the "Art of Dispensing," somewhat similar to the last, but possesses the advantage that it is available for varying quantities. It consists of a piece of plate glass with three small pieces cemented on its three sides, the fourth being left open, for which a movable piece of glass is provided; the whole surface is divided into squares by means of grooved lines, and the loose piece of glass is moved up to any series of squares required and secured in its place by means of a cork.

The following pastilles are official in the Throat Hospital Pharmacopœia:

Acid, Boracic.....	grains ij.
Acid, Carbolic.....	grain ½
Ammonium Chloride	grains xi.
Bismuth Subcarb.....	" ij.
Bismuth, grains ij., and Morph. Acet.	grain 7½
Bismuth, grains ij., and Pot. Chlorate.....	grains ij.
Iodoform.....	grain i.

Quoting from the Extra Pharmacopœia as to the advantages of glyco-gelatin for administering these and other medicines, it affords a ready means of prescribing lozenges to meet individual cases, and pastilles are specially suited to cases of inflammation of the tongue and palate, and their gelatinous nature gives much relief in dryness of the throat. I have here some pastilles:

Cocaine Hydrochlor....	gr. ½
Acid. Hydrochlor. dil	℥ ½

and flavored with essence of lemon. The acid is added to overcome in some degree the sweetness of the glycerin.

Having noticed that the official pastilles containing ammonium chloride are slightly moist, I thought a stiffer basis might overcome this objection, and I made one, but it was not a success.

The coloring used for the glyco-gelatin is generally an ammoniacal solution of *carmine*, and Mr. Wyatt in his paper gives the following formula for making it, which I find well suited to the purpose:

Carmine.....	grains xxx.
Water of Ammonia.....	q. s.

Dissolve the carmine in 3 vi. of the ammonia, filter, and wash the filtrate with sufficient water to collect 3 i. of the coloring. I have used another coloring, viz., *liquid saffron*, which I made as follows:

Saffron.....	grains xxx.
Boiling Water.....	q. s.
Alcohol.....	3 i.

Pour about 1 ounce of boiling water on the saffron, infuse until cold, filter, press the marc, add the alcohol and

any necessary water to make 3 i. About 5 minims of this added to an ounce of the mass give a good tint.

The subject of flavoring is rather a wide one; many different substances may be added where suitable. Ext. glycyrrh. liq., or, better still, glycyrrhizin, suggests itself as an admirable thing for covering the taste of chloride of ammonium; the fruit juices would in many cases be admirable substitutes for the orange-flower water used in making the basis.

I must not omit to mention tolu, the efficacy of which valuable medicine would in no way be impaired by being exhibited in the form of pastilles.

I have also used the essences of lemon, vanilla, and almonds for flavoring at various times.

New Antipyretics.

SOME particulars have been published concerning two more new compounds alleged to possess antipyretic properties, which have been prepared by Prof. Michaelis (*Pharm. Centralh.*, January 16th, page 35). One of them is called acetyl-ethylene-phenyl-hydrazin, and is said to be obtained by acetylizing ethylene-phenyl-hydrazin, which itself is formed by the action of ethylene bromide upon sodium-phenyl-hydrazin. It is described as occurring, when crystallized from alcohol, in colorless needles, melting at 220° C., and having the composition represented by the formula



The ether compound is called ethylenephénylhydrazin-succinic acid. It is said to be obtained by dissolving equal parts by weight of ethylenephénylhydrazin and succinic anhydride in alcohol, and boiling; from the liquid, which is clear at first, the acid quickly separates under strong ebullition and in such abundance that the liquid solidifies to a paste. This acid is described as being soluble in alcohol, and as crystallizing in needles that melt at 203° C.—*Pharm. Journ.*

Lister's Double Cyanide Gauze.

SIR JOSEPH LISTER, in the *Lancet* of January 4th, 1890, describes the method of preparing his new surgical dressing thus: Cyanide of potassium, cyanide of mercury, and sulphate of zinc are mixed together in solution in quantities proportioned to their atomic weights; the cyanide of potassium and cyanide of mercury being dissolved together in 1½ ounces of water for every 100 grains of potassium cyanide, and added to the sulphate of zinc dissolved in three times that amount of water. The precipitate is collected on a strainer, and when well drained is washed with two successive portions of water, equal in quantity to that used for the solution—viz., 6 ounces for every 100 grains of potassium cyanide; at least this amount of washing being essential in order to free the precipitate sufficiently from the highly irritating soluble salts which are associated with it in its formation. The precipitate having been thus washed and drained, but not dried, it is thoroughly diffused with pestle and mortar in distilled water (6 ounces for every 100 grains of potassium cyanide), containing in solution 1 part of hæmatoxylin for every 100 parts of the cyanide salt, the amount of which is known from the circumstance that the dry product of cyanide salt is almost exactly equal in weight to the potassium cyanide employed. Hæmatoxylin is readily soluble in a small quantity of hot water, and remains in solution when added to a large quantity of cold water. The cyanide salt, while it precipitates the hæmatoxylin, changes its color to a pale bluish tint. This is advantageously enhanced by the addition of a little ammonia to the mixture in the proportion of 1 atom of ammonia to each atom of hæmatoxylin. More than this proves prejudicial. The ammonia is added in a dilute form, and it is convenient to have the dilution such that 1 fluid-drachm of the ammoniacal liquid shall correspond to 1 grain of hæmatoxylin. The dye is further economized by allowing the ammoniated mixture to stand for three or four hours, and stirring it occasionally, so that the ingredients may react thoroughly upon each other. If the mixture is filtered immediately, there is considerable loss of coloring matter. The dyed salt, having been drained and dried at a moderate heat, is levigated, and may then be kept for any length of time. When employed for charging a dressing, it is diffused by means of pestle and mortar in solution of bichloride of mercury (1 to 4,000) in sufficient abundance to drench the fabric thoroughly, for which 4 imperial pints to 100 grains of the salt will be found adequate. This will give a percentage of between 2 and 3 of the cyanide to the dry gauze. The gauze should always be used moist; and if it be prepared for immediate use, the process of drying may be omitted, the gauze, after being hung up for a while to drain, being further deprived of superfluous moisture by placing it in a folded sheet. It may afterward be conveniently kept moist by wrapping it in a piece of mackintosh cloth. When obtained dry from the manufacturer, it should be moistened again with the weak corrosive sublimate before it is used.

Hypophosphorous Acid.

THE Committee having in charge the Formulary of the British Pharmaceutical Conference have issued a four-page supplement, from which we select the formula for hypophosphorous acid, to which we have added the comments of the *Chemist and Druggist*:

Hypophosphite of Barium, containing not less than 95 per cent $\text{Ba}_2(\text{PH}_2\text{O}_3) \cdot \text{H}_2\text{O}$8 oz.
Diluted Sulphuric Acid,
Distilled Water.....of each a sufficient quantity.

Dissolve the hypophosphite of barium in 36 fluidounces of hot distilled water. Add slowly to the solution 17½ fluidounces of diluted sulphuric acid, after which continue the addition, drop by drop, until no further turbidity is produced. Set aside in a warm place, and pass the clear liquid through a filter. Wash the precipitate by decantation with successive portions of hot distilled water until the washings have no longer an acid reaction. Filter, unite the filtrates, and evaporate the liquid on a water-bath to the prescribed density. The product will weigh about 11½ ounces.

Characters and Tests.—Colorless. Specific gravity 1.1367. Its strength, as determined by volumetric solution of soda, corresponds to 30 per cent of hypophosphorous acid. Its aqueous solution is not precipitated by diluted sulphuric acid, nor by an excess of ammonia, nor by oxalate of ammonia after neutralization, and gives not more than a faint opalescence with chloride of barium. If solution of ammonio-sulphate of magnesium be added after an excess of ammonia, no precipitate is produced. Chloride of calcium added to a neutralized solution yields no precipitate.

The prominence to which the various preparations of the hypophosphites have attained, and the favor with which they are regarded, have rendered necessary the introduction of hypophosphorous acid, and the committee wisely supply a formula for its preparation and tests for its purity. Regarding this acid there has been a lot of discussion, and hitherto finality has not been reached. . . .

The various processes that have been suggested from time to time are all more or less faulty, the chief difficulty being solubility, to a greater or less extent, of the decomposition by-product in the acid. Of these a commonly used process is that which consists in the decomposition of calcic hypophosphite by oxalic acid, but the objection to this is that calcic oxalate is partly soluble in hypophosphorous acid. Calcic hypophosphite may also be decomposed by sulphuric acid, and this process is in use, we believe, by some makers; but a similar objection holds here, since calcic sulphate also remains in solution for a time, being ultimately deposited in a crystalline form. The United States National Formulary gives a formula which follows somewhat the lines of Fothergill's original process for making hydrobromic acid. Hypophosphite of potassium is dissolved in water, and tartaric acid in diluted alcohol; the two solutions are mixed, acid tartrate of potassium precipitated, and the filtrate contains the hypophosphorous acid. The alcohol is then evaporated off and the liquid made up with water.

A modification of this process, in so far as the use of the alcohol is concerned, has been proposed in connection with the oxalic-acid process first mentioned, viz., by precipitating the calcic oxalate by means of alcohol, and evaporating off the spirit. All these processes have, we understand, been fully considered by the committee, and several of them tested both on the small and the manufacturing scales; but the committee have fallen back on the very safe plan of decomposing barium hypophosphite with sulphuric acid. The formula contains a barium salt containing 95 per cent of hypophosphite, and the proportion of dilute sulphuric acid is calculated on this basis. It unfortunately happens, however, that sometimes barium hypophosphite is less than 95 per cent—we have met with such samples, although they were specially bought as 95 per cent—and in cases such as these the quantity of dilute acid ordered would be slightly in excess. Seventeen fluidounces would be better than 17½ in the first instance, and then add the remainder of the acid gradually. The process is tedious, but it gives a very satisfactory acid, which corresponds in acidity and specific gravity, and it is more free from impurity than any we have met with made by another process.

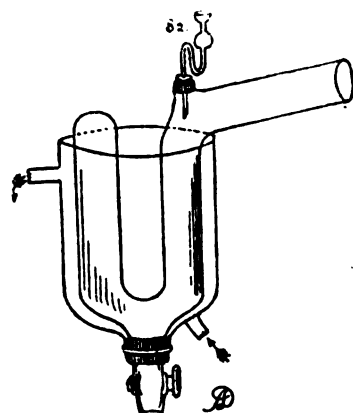
Antipyrine and Chloral Hydrate.

A FEW months since (*AMER. DRUGG.*, 1889, page 170) M. Blainville reported that when antipyrine and chloral hydrate are dispensed together, an oily liquid is formed, in which crystals are subsequently found possessing the taste of neither the one nor the other compound. This statement is confirmed by Ludwig Reuter, who has made a closer investigation of the crystals as to their nature (*Apot.-Zeit.*, January 25th, page 45). They were found to be only slightly soluble in cold alcohol, ether, or chloroform, a little more soluble in boiling alcohol and boiling water, and totally odorless and tasteless. When treated with cold caustic soda solution there was no separation of chloroform, while with ferric chloride there

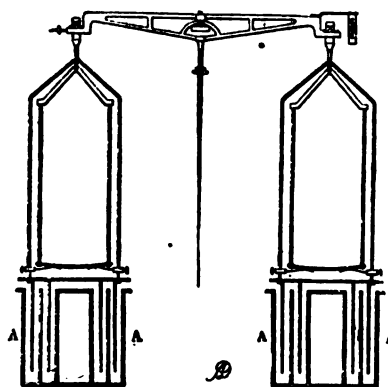
was only a slight yellow coloration, not at all the characteristic red of antipyrine. Upon heating the crystals with caustic soda solution decomposition took place, traces of chloroform being at first given off and then much isonitril, together with a separation of antipyrine and its decomposition products; the acidulated liquid then gave an intense red color with ferric chloride. Nitrous acid had no effect upon the crystals in the cold, the characteristic blue-green of isonitrosoantipyrine not being produced. It would appear, therefore, that from antipyrine and chloral hydrate a rather stable compound is formed, described by Reuter as "trichloral-dehydropenyl-dimethyl-pyrazol," with which composition he considers the results of his analyses to have been in accord. He states that the same compound is also easily obtained upon heating together chloral hydrate and antipyrine to 115° C., and that it crystallizes from alcohol in dense scales. Upon rabbits the new compound failed to produce the effects characteristic of either of its constituents, and as far as the experiment went it appeared to be a therapeutically indifferent body.—*After Pharm. Journ.*

A NEW CONDENSER.

C. SOHLARR some time ago proposed a new form of condenser which serves, at the same time, as a receiver. It consists of a U-shaped tube with inlet for receiving the end of the neck of the retort, an outlet provided with stop-cock, and a tubulure provided with a safety tube. The U-tube stands in a vessel in which a stream of cold water is kept circulating.—*Chem. Zeit.*

**AN IMPROVED BALANCE.**

FOR the purpose of enabling the operator to weigh with greater celerity without impairing accuracy, P. Currie proposes to employ balances in which the scale pans are brought to a speedy rest by friction with air. The substance to be weighed being put on one scale pan, sufficient weights are put upon the other to restore the equilibrium within 0.200 Gm. When the balance has then come to rest, which requires only about two swingings, the deviation of the index from the centre is read off on a scale or vernier, and the weight within the 0.200 Gm. thus determined. A specially prepared scale,



reduced from an enlarged one by photography, and a microscope enable the operator to read off the weight within one-tenth milligramme.

The pan arrest is constructed after the plan shown in the cut. Each scale pan has attached to its under surface two concentric brass (or other metallic) cylinders, which play, without friction or contact, within the space left by corresponding cylindrical walls in a vessel below (A). The arrest of the pans is caused merely by the friction of air.—*Zeitsch. anal. Chem.*, 1890, 61.

A New Reagent for Sugar.—At a recent sugar meeting of the Mulhouse Industry Society, M. Matthieu-Plessy described a new reagent for cane sugar, grape sugar, and pyrogalllic acid, consisting of a solution of lead parani-trate (PbHNO_4) in an excess of melted ammonium nitrate (*Mon. Scient.*, Dec., page 1446). It is prepared by melting 54 parts of ammonium nitrate and adding to it 34 parts of lead nitrate and 21 parts of lead hydrate. The reagent melts at about 115° C., and in contact with glucose it gives a cherry-red color; with cane sugar the color of *café-au-lait*; and with pyrogalllic acid a chrome-green color.—*Pharm. Journ.*

Artificial Digestion.

IN the course of a paper treating of the artificial digestion of proteids, with particular reference to those existing in the usual kind of fodder for animals, Prof. Stutzer gives directions for preparing permanent solutions of pepsin and of pancreatin, also useful hints which are apt to facilitate the tedious filtration of peptic or pancreatic albuminoid solutions.

Before he treats a sample of fodder with the digestive ferment, he subjects it, in fine powder contained in a bag of filtering paper, to the action of ether, in an extraction apparatus, during five or six hours. The removal of the fat has been found to remove the difficulty encountered in the subsequent filtration, as it is the fat which usually stops up the pores of the filter.

[It would, therefore, appear that a previous treatment with ether is advisable in the case of all crude natural proteids which are used in digestive experiments. The white of egg contains small quantities of olein and palmitin and other fatty matter.—ED. AM. DRUGG.]

Preparation of Pepsin Solution.—The fresh mucous membrane of the stomachs of hogs is cut into small pieces, the mass put into a wide-mouthed bottle, and a quantity of water and hydrochloric acid added corresponding, for every stomach, to 5 quarts of the former and 10 Gm. of absolute hydrochloric acid. To preserve the liquid, 2.5 Gm. of salicylic acid are also added for every stomach. The mixture is allowed to macerate one or two days, under occasional agitation. It is then poured through a flannel bag, without pressure, and then filtered, first through a coarse, and then through a finer filtering paper. The liquid thus prepared will keep unchanged for months.

Preparation of Pancreatin Solution.—A sufficient quantity of pancreas from beeves is freed from fat as much as possible, finely chopped, triturated with sand, and then left exposed to the air for twenty-four to thirty-six hours. The mass is then triturated, in a mortar, with lime water and glycerin, a little chloroform is added (for keeping), and the mixture set aside for four to six days. The insoluble portion is now separated by expressing, the liquid portion passed through a coarse filter, the filtrate heated during two hours at a temperature of 37° to 40° C. (98° to 104° F.), and, if necessary, filtered again. For every kilo of fat-free pancreas there should be used 3 liters of lime water and 1 liter of glycerin (spec. grav. 1.230). The liquid thus prepared keeps unchanged for a long time, if enough chloroform is added to the final filtrate to have a few drops of it remain undissolved at the bottom of the vessel. Heretofore complaint has been made that the pancreatic extract filtered so slowly. This drawback is removed by the new proportions between lime water and glycerin, and by warming before the second filtration.

Prof. Stutzer's experiments on the digestibility of fodder were conducted as follows:

The sample (2 Gm.), previously deprived of fat as stated above, is covered with 250 C.c. of the pepsin solution, and warmed at 98° to 104° F. during twenty-four hours. During the first hours, at intervals of one hour, portions of 2.5 C.c. of a 10-per-cent hydrochloric acid are added until the whole liquid contains 1 per cent of HCl. The digestion is conducted in beakers standing in simple water-baths. Filtration is usually accomplished through asbestos by placing into the neck of a funnel, first, a cone made of brass wire, and then covering this with coarse-fibred and lastly with fine asbestos. In the case of pectous substances, it is preferable to use acid-washed filter paper, 12.5 Cm. in diameter, since pectin bodies soon stop up an asbestos filter.

Preparation of the Alkaline Pancreatic Liquid.—Mix 250 C.c. of the pancreatin solution, prepared as above directed, with 750 C.c. of a solution containing 5 Gm. of sodium carbonate (reckoned as anhydrous). Warm this mixture on a water-bath during one or two hours, at a temperature of 98° to 104° F., and remove any flakes which may form from time to time separate, by filtration. It will thus become entirely clear, and is then ready for use. If it is to be kept over twenty-four hours without change, it is necessary to add to it some more chloroform (enough to saturate it).

The experiment of digestion is conducted as follows:

One hundred C.c. of the dilute alkaline pancreatic liquid last mentioned are put into a small "spritz" flask, and by means of it the residue of the sample which had already been treated with pepsin, as described above, and is still on the paper or asbestos filter, is, while still moist, washed into a beaker. If the filter was asbestos, this may be washed into the beaker at the same time. The mixture is warmed during six hours between 98° and 104° F., being occasionally stirred. It is then filtered through acid-washed paper (Schleicher & Schuell, No. 589; 12.5 Cm. in diameter). The insoluble matter remaining is washed with water, the filter and contents dried, and the nitrogen which remains in the insoluble portion determined by Kjeldahl's method. From the amount found, the nitrogen derived from the filter—which usually amounts to 0.050 to 0.100 Gm.—is deducted.—*Zeitsch. f. angew. Chem.*, 1890, 60.

Jalap and Jalap Resin.

FROM a paper on this subject by Prof. F. A. Flückiger, published in the *Journ. de Pharm. d'Als.-Lorr.*, and translated in the *Pharm. Journ.* (January 11th), we select the following:

The resin of jalap is a much-used remedy, not yet supplanted by synthesis, which medicine, apparently, would not willingly be deprived of. But for nearly twenty years the fact has been becoming more and more evident that the tubers of *Ipomoea purga*, the only material used in Europe and America in the preparation of Resina jalapæ, yield less of that substance than in former times. In 1842 Chénouet, experienced and careful in such matters, found no less than 17.65 per cent of resin, and statements varying between this amount and 10 per cent were about that time not infrequent, if I read correctly. The authors of "Pharmacographia" have brought together (page 103) a few statements on the subject from the circle of their friends and acquaintances; the older drug houses would probably be in a position to contribute towards making them more complete. But probably for the last twenty years, as it appears to me, the statements of 10 per cent yields, or upwards, have been fewer, and the larger proportion of the jalap has yielded less, frequently only a small percentage of resin.

Whence this phenomenon? The complaint that the drug appeared inferior or consisted of smaller tubers has by no means been heard during the same time; indeed, to my knowledge, it has not been proved that the larger and older pieces are richer in resin. Reasons for an actual retrogression in the resin formation in the root organism of the jalap plant are not conceivable, so that one is brought to the presumption that a fraudulent abstraction from the jalap takes place. Of this Dr. Squibb, in the latest number of the *Ephemeris* (July, 1889), presents an indication the importance of which should not be underestimated. He made applications in Hamburg, London, and New York to be supplied with the finest jalap in considerable parcels, but obtained only one consignment that yielded more than 7½ per cent of resin. One house in New York, not more exactly specified by him, sent a representative to the district in Mexico that formerly yielded jalap, and authorized him to purchase the root at any price on the spot. Two hundred pounds obtained in this way yielded 16.9 per cent of resin. A further quantity of some hundreds of pounds, from the neighborhood of Xalapa and Perote, was on its way.

It may, therefore, be probably assumed that the dealer in Mexico has acquired sufficient chemical knowledge to wash the jalap with alcohol. If it were previously charred by suitable drying at a fire, it would not undergo any remarkable change through a short immersion in alcohol; and it may easily be demonstrated that if the root is previously bruised this is never the case.

Artificial Musk.

THE *Journal de Pharmacie d'Alsace-Lorraine*, in its last issue, says: Artificial musk is a chemical product, appearing in crystals of a yellowish white color and of a strong musk odor. For perfumery purposes the crystals should be dissolved in alcohol, with the addition of a trace of ammonia or carbonate of ammonia. This solution, which may be compared to tincture of musk, surpasses the latter in the intensity and penetrating power of its odor. The product to be used in perfumery must previously be diluted in a homoeopathic manner. The following are the rather loose details of the manufacture of the article which have been deposited with the German Patent Office: "Boil in a reflux condenser toluol or toluene, C₇H₈, with one of the following halogen compounds of butyl, viz., chloride, bromide, or iodide of butyl, along with chloride or bromide of aluminium. The resulting product falls back into the water in the still, where it is decomposed and is distilled in a current of water vapor. The parts which distil between 170° and 200° are collected separately and treated with a mixture of nitric and fuming sulphuric acid. The product obtained from this process is washed and redistilled in alcohol, from which the artificial musk crystallizes out." The patent rights for France and abroad have been disposed of to a syndicate of manufacturing perfumers. There is no doubt that the trade in natural musk, so far as the perfumery branch is concerned, is threatened with a very serious crisis. The use of musk in medicine is very restricted, the article being now only employed in certain cases of typhus.—*Chem. and Drugg.*

Phosphorus in Diabetes.—Dr. Balmanno Squire was recently consulted in regard to a skin affection from which an old gentleman of sixty suffered. Phosphorus perles was the internal remedy prescribed, and under this treatment diabetic symptoms, which the patient had manifested, gradually abated, and the patient greatly improved in health. Dr. Squire therefore recommends a trial of phosphorus in diabetes; dose beginning with one-thirtieth of a grain, and increasing to double that amount.—*Chem. and Drugg.*

Adulteration and Sophistication of New Drugs.

In a paper upon the above topic in the *Druggists' Bulletin* for November, Mr. Geo. S. Davis mentions that, owing to the limited information in regard to new drugs as compared with those which have been longer in the market, their adulteration and sophistication is not attended with much risk of detection. He mentions, among other articles, the following as having come to his attention:

Frankenia grandifolia (Yerba Reuma) was, upon its first introduction, substituted with *Distichlis maritima*, a totally different plant, whose only claim to similarity was that it grew in the same localities and had the same appearance.

Turnera microphylla var. *Damiana*.—The leaves of *Bigelovia veneta*, a Mexican plant, are occasionally mixed with it. Both leaves are small, not exceeding an inch in length, and otherwise quite similar, although belonging to different natural orders.

Rhamnus Purshiana (Cascara Sagrada).—*R. Frangula* (common buckthorn), *R. Californica*, and other species of the same natural order, are very frequently substituted for or mixed with it.

Berberis Aquifolium.—*B. repens* is frequently found in the market under this name, although it contains much less berberin than the genuine.

Strophanthus seeds are very frequently adulterated with the seeds of *Holarrhena antidyenterica*, an East Indian plant, which fact, of course, proves the adulteration to be anything but accidental, *strophanthus* growing only in Africa.

Strychnos Malaccensis (Hoang-Nan).—This bark is occasionally found entirely replaced by the bark of the false angostura, or *nux vomica* tree (*Strychnos Nux-vomica*).

Pilocarpus pennatifolius.—Some alleged substitution of this drug on its first introduction was claimed to arise from the fact that the vernacular name, *jaborandi*, was assigned in South America to almost any plant having diaphoretic properties, some districts holding one particular plant in greater estimation than the *jaborandi* of other localities, even when the latter were found native in the habitat of the former. The leaves of *Serronia Jaborandi* are still placed in small lots on the market as the genuine *jaborandi*.

Grindelia squarrosa.—*Grindelia robusta* has been offered at various times as the genuine.

Pichi wood is very often employed instead of *pichi* tops, although the former contains but an infinitesimal proportion of the principles upon which the drug depends for its activity.

Jamaica Dogwood.—The bark of old trees is very frequently offered instead of the bark of the root.

Viburnum prunifolium, as found upon the market, instead of being collected from the root of the plant, as should be the case, often proves to have been cut from the trunk.

The Star Anise Industry in Tonquin.

DR. R. BLONDEL, through the medium of certain Tonquinese merchants who visited the Paris Exhibition, and with the assistance of the French Colonial Department, has brought to light a number of interesting new facts concerning the cultivation of the star anise tree in Tonquin, which he communicates to *Répert. de Pharmac.* The actual area in which the true star anise (*Illicium anisatum*) grows is very much smaller than that over which it was generally believed to be distributed. The trees, in fact, grow in one province of Tonquin only, viz., that of Lang-Son, which is about the size of two average French departments. Outside the province of Lang-Son, Mr. Blondel states, not a single tree is found. The geographical limits of the province of Lang-Son are the Ma-Son mountains and the Vau-Quan territory in the west, the Tan-Moy country in the south, and the Chinese frontiers in the north. A small part of the star anise country, in fact, overlaps the Chinese boundary, but the quantity of fruit gathered on Chinese territory is very small indeed, and does not yield over 10,000 to 12,000 pounds of essential oil, which was formerly sold by the Chinese dealers to the Hong-Kong merchants. But in the 1889 season nearly the whole of this oil has gone across the French-Indian frontier to swell the distillate of the Tonquin district, and was carried along with the latter to the market of Hai-Phong. In former seasons the directly opposite tendency prevailed, and the Lang-Son essential oil collected by the Chinese merchants was taken by them, along with their own, through southeastern China to Macao and Hong-Kong, whence English and German houses shipped it to London and Hamburg, these two markets being the central points of the trade. The exertions of the French-Indian Government have secured the future of this trade to French subjects, and the essential oil follows the Tonquin trade route. A competent judge states that not one pound of oil reaches Macao.

There are no regular star anise plantations in Tonquin. The trees grow up spontaneously, in patches of varying size, sometimes covering only 25 square feet surface and

sometimes extending over 800 square feet. On the slopes of this hilly country the trees form small boscajes, the greater part being situated on the slopes facing the sea. No special care is needed for the propagation of the trees. The attempts to cultivate the tree from seed in Hanoi and on the Bavi Mountain have always failed, in spite of all the precautions taken. The natives have also failed to propagate it from cuttings, although they are remarkably clever agriculturists. The star anise plots are the common property of the village. The crop is gathered and the distilling conducted at the public cost, and the profits afterwards divided. The tree does not yield any serviceable seed until its twelfth year, when it has grown to a height of about 14 feet. It then yields without interruption until its thirtieth to its thirty-fifth year. The trees are never cut down, even when dead: their hard and close-grained wood is regarded sacred by the natives, who will not use it at any price. During the French campaign in Tonquin serious disputes arose when the French engineers attempted to cut down these trees for building bridges.

The Distilling.—Every village possesses its own brick-built ovens in which the distilling process is conducted; some villages have as many as fifty of these ovens, which are large structures of brickwork, from 6 to 7 feet in height, and about 4 feet in diameter at the base. They have a closed and slightly vaulted roof. Part of the brickwork at the base of the back wall is removable, and through it the large copper distilling dish is introduced into the oven. A groove in the brickwork holds the edge of the dish and keeps it in its place. The removable piece is then replaced, thus entirely closing the oven. The seeds are put in the dish with a small quantity of water, and underneath a large wood fire is lighted, which receives air through a small hole at the front part of the brickwork. The essential oil [is vaporized, collects at the vaulted dome] trickles down into a groove about 2 feet below the top, and is conducted through a tin or bamboo tube, whence it passes into the collecting vessel. The distilling dish holds about 8 cwt. of fruit, which yields on the average 22 pounds of essential oil.

The vessels containing the oil are brought to the town of Lang-Son, the total quantity there being from 600 to 700 cwt. per annum. At Lang-Son the oil is transferred from the native earthenware pots into tins, which are carried on the backs of natives to Phu-lang-Thuong, on the Song-Koi, or Red River, and from there the French steamers take the bulk of the oil to Hai-Phong for shipment, a small quantity also reaching the port by road.

Besides the true star anise trees of Lang-Son there is not another tree, true or false, to be found in the whole of Tonquin. In Annam, in the district of Quin-Hon on the coast, grows another species of *Illicium*, with smaller fruit, and more arched and smoother capsules, which is regarded as poisonous, and is never gathered for distilling purposes.



FIG. 1.

FIG. 2.

A TRIPLE BUNSEN BURNER.

A MODIFICATION of a Bunsen gas burner, designed by Mr. F. W. Branson, of Leeds, England, combines in one piece of apparatus several gas burners, and is simple in construction and not liable to derangement. Either one, two, or three Bunsen or luminous flames may be used, and the air or gas supply of either jet can be regulated independently or entirely cut off.

The air regulators are arranged in the usual way. The gas supply is controlled by altering the position of the jets. If arranged as in Fig. 1 or 2, the gas supply is at full. If, however, either jet be rotated in the opposite direction, the gas is gradually reduced and finally cut off. Fig. 2 shows the three jets arranged for a single large flame, but if the jets are separated, as in Fig. 1, a much larger area can be heated by means of the three distinct flames which then result.—*Journ. Soc. Chem. Ind.*, 1889, 957.

The Cultivation of the "Insect Powder Plant."

MR. P. MACOVAN, F.L.S., of the Cape Town Botanic Garden, makes some remarks on the plants yielding Persian insect powder (*Gard. Chron.*, January 11th, page 44), which seem to indicate that attention is being drawn to the cultivation of these plants in the colony. The flowers are at times so scarce and the powder frequently so adulterated that it may be hoped the market may be supplied in the future from so promising a district. Mr. MacOvan describes the plant called *Pycnanthemum Willemotii*, Duch.—named after Mr. C. Willemot, who commenced in 1856 the cultivation of the "Caucasian" plants in France—as being identical with *P. cinerariæfolium*. Neither under the one name nor the other, however, is the plant mentioned in Boissier's "Flora Orientalis" as a native of the Caucasus, although both *P. roseum* and *P. carneum* are therein enumerated. Mr. MacOvan points out that *P. cinerariæfolium* likes an open, dry soil, not too clayey, as both the seed and the plant are easily killed by excessive moisture. The seed is sown about half an inch below the surface, and germinates in about thirty days. As soon as the plants can be handled they are placed six inches apart, and in three months' time are placed one foot apart. The flowers are produced in the second year. In this country the plant appears to stand the winter in sandy loam in the south of England, but has not been observed to flower freely. There is, however, some difficulty in obtaining good seed, for the seed sent from Dalmatia has at times been found to have been carefully baked to prevent its germination.—*Pharm. Journ.*

Copper Salts as Remedies for Potato Blight.

IN regions where certain forms of disease blight growing potatoes, apothecaries may add to their business the sale of the following mixtures:

1. Pulverized sulphate of copper, 6 pounds, to be dissolved in 4 gallons of hot water; fresh lime, 4 pounds, to be diffused in 4 gallons of cold water. These two solutions are to be mixed and enough cold water added to make 22 gallons.

2. Carbonate of copper, 3 ounces; ammonia, 1 quart; mix. After the solution of the copper salt add enough cold water to make 22 gallons.

The former of these is known as the "Bordeaux Mixture."

When the plants are about a foot high, and before the blossoms appear, they are to be sprayed with one or the other of these solutions, and this is to be repeated at least as often as every two or three weeks, and oftener when the occurrence of rain washes the deposit of copper salt from the plants. The latter mixture is said to be equally effective as the former, and has the advantage, from the apothecaries' point of view, of being in a form which can be prepared in advance and bottled for sale, requiring only the addition of water. For further details, see the *Scientific American* of January 25th, or the *Garden and Forest* of about that period.

Metallic Manganese.

A NEW mode of preparing manganese, by which the metal can be obtained in a few minutes in tolerably large quantities and almost perfectly pure, is described by Dr. Glatzel, of Breslau, in a current number of the *Berichte*. A quantity of manganous chloride is first dehydrated by ignition in a porcelain dish, and the pulverized anhydrous salt afterward intimately mixed with twice its weight of well-dried potassium chloride. The mixture is then closely packed into a Hessian crucible and fused in a furnace at the lowest possible temperature, not sufficient to volatilize either of the chlorides. A quantity of metallic magnesium is then introduced in small portions at a time, the total quantity necessary being about one-sixth of the weight of the manganous chloride employed. Provided the crucible has not been heated too much above the melting point of the mixture of chlorides, the action is regular, the magnesium dissolving with merely a slight hissing. If, however, the mixture has been heated till vapors have begun to make their appearance, the reaction is extremely violent. It is therefore best to allow the contents, after fusion, to cool down to a low red heat, when the introduction of the magnesium is perfectly safe. When all action has ceased, the contents of the crucible are again heated strongly, and afterward allowed to cool until the furnace has become quite cold. On breaking the crucible, all the potassium chloride and the excess of manganous chloride is found to have been volatilized, leaving a regulus of metallic manganese, fused together into a solid block, about 3 parts by weight being obtained for every 2 parts of magnesium added. The metal, as thus obtained, is readily broken up, by hammering, into fragments of a whitish-gray color, possessing a bright metallic lustre. The lustre may be preserved for months in stoppered glass vessels, but when exposed to air the fresh surface becomes rapidly brown. The metal is so hard that the best files are incapable of making any impression upon it. It is so feebly magnetic that a powerful horse-

shoe magnet capable of readily lifting a kilogramme of iron has no appreciable effect upon the smallest fragment. It was noticed that the introduction of a small quantity of silica rendered the manganese still more brittle, and caused it to present a conchoidal fracture, that of pure manganese being uneven. The specific gravity of the metal, former determinations of which have been very varied, was found to be 7.3921 at 22° C. This number, which was obtained with a very pure preparation, is about the mean of the previous determinations. Dilute mineral acids readily dissolve the pulverized metal, leaving a mere trace of insoluble impurity. It is also satisfactory that practically no magnesium is retained alloyed with the manganese, and the introduction of carbon is altogether avoided by the use of this convenient method.—*Nature*.

Antiaris Toxicaria and its Constituents.

THE milky juice of *Antiaris toxicaria*, used as arrow poison in the East Indian Archipelago, contains, according to H. W. Bettink, at least three active principles, which seem to be closely allied to each other (*Ned. Tijdschr. v. Pharm.*). The most important of these, antiarine (C₁₂H₁₀O₄), is precipitated from its solutions by tannin, but only in a state of insoluble combination with other substances. When the dried juice has been treated with petroleum ether or benzol, the resin, the fat, and the india-rubber-like portion removed, and the residue extracted by alcohol, a thick fluid remains, from which the antiarine separates in the form of crystals. These represent about 1.7 per cent of the dry, or 0.6 per cent of the fresh juice. According to Tichmann, they belong to the rhombic system. By addition of sulphuric acid they are colored light brown and decompose. Dogs and rabbits are killed in a few moments by a dose of one-half Mgm. injected into the blood. The second constituent is obtained from the same syrupy mass or mother-liquid by drying it on a water-bath, letting it stand for twenty-three hours, and then stirring it up with small quantities of water, during which process more of the antiarine crystals will be separated. After they have ceased to form, a substance may be thrown down by diluting the mother-liquid with water and adding a solution of tannin. This substance, for which the name oubaine has been proposed, very closely resembles antiarine in its physiological effects, and gives the same reactions with acids, but differs in being very soluble in water and in its behavior towards tannin. The third constituent of the juice—also non-crystallizable, easily soluble in water and alcohol, but not precipitated by tannin—is called toxicarine. The author promises further communications upon the subject.

Determination of the Specific Gravity of Viscid Liquids.

IT happens not seldom that the chemist has to determine the specific gravity of a liquid which is very viscid and obstinately retains air bubbles. The presence of the latter renders it impossible to make an accurate determination. The usual method heretofore pursued to get rid of the air has been to warm the liquid until all bubbles have escaped, but this was usually accompanied by loss of water. [A subsequent addition of water, to make up the former weight, is of little value, since this newly added water would have to be homogeneously mixed with the viscid liquid, and this very operation would be apt to introduce air bubbles again.—ED. AM. DR.]

Dr. Ad. Genieser now proposes the following manipulation to overcome this difficulty:

The viscid liquid is first gently warmed (care being taken that no notable loss of water may occur) so as to render it more thin fluid, then passed through a wire sieve (to remove impurities, if necessary—for instance, in the case of molasses), and enough of the strained liquid poured into a specific-gravity bottle to fill it about two-thirds full. Supposing the pycnometer had weighed, empty, 24.6506 Gm., and with the syrup or other viscid liquid 79.4420 Gm. It would, therefore, contain 54.7914 Gm. of the syrup, etc. Next the pycnometer is cautiously heated in an oil-bath, or preferably in a salt solution of such density that its boiling point is somewhat above that of the syrup, until the latter actually boils. By keeping it at this temperature a few minutes all air bubbles will be driven to the surface and there form a thin scum. The bottle is now cooled to 17.5° C. (ab. 64° F.), and then a little distilled water added, which will speedily form a clear layer between the air-free syrup and the scum, and the latter will rapidly be dissipated, as it consists of air bubbles. The pycnometer is then completely filled with distilled water and weighed. Supposing it should weigh 89.766 Gm., it follows that, not counting the evaporated water, there were added 89.766 — 79.442 = 10.324 Gm. of water. Supposing, further, that the pycnometer is known to hold exactly 50 Gm. of water at 17.5° C. (64° F.), it follows that the syrup within the pycnometer occupied the same space as 50 — 10.324 = 39.676 Gm. of water. Hence its specific gravity is 54.7914 : 39.676, or 1.38097.—*Zeitsch. f. angew. Chem.*, 1890, 44.

Sodium Cresotinate or Cresotate.

As far back as 1876 sodium cresotate (or cresotinate*) was recommended as an antipyretic, but it appears to have fallen into discredit on account of uncertainty of action. As the compound used was probably a varying mixture of the sodium salts of the three isomeric acids derived from the corresponding cresol isomers, Prof. Domme instituted some comparative therapeutic experiments with the separated compounds (*Pharm. Zeit.*, January 29th, page 68). He reports that only the paracresotic acid is of use in medicine, the ortho- and meta-compounds proving, one inactive, and the other dangerous. Prof. Loesch found that sodium paracresotate is well tolerated by adults in quantities reaching to 6 or 8 Gm. daily. A part of the compound appears to pass unaltered into the urine, which then gives a violet color with ferric chloride. Administered to children it behaved as an active antipyretic in large doses, 1 Gm. having been given to a child twelve years old within three hours. It is further stated that good results have been obtained with the salt in the treatment of acute gastro-intestinal catarrh in children. Sodium paracresotate is said to occur as a fine crystalline powder, with a distinctly bitter but not disagreeable taste. It dissolves in 24 parts of warm water, from which it does not separate on cooling. The free acid crystallizes from aqueous solutions in long, shining needles; it melts at 151° C., and sublimes undecomposed.—After *Pharm. Journ.*

Improvements in the Manufacture of Glycerin and Fatty Acids.

WHILE formerly the decomposition of fats, for the production of fatty acids (in the stearin industry) and of glycerin, was accomplished by first converting the fats into a calcium soap, this method has for many years given place, in most large works, to the process of "aqueous saponification," as it is sometimes called, that is, to a process in which the fat is decomposed, by the action of superheated steam, into fatty acid and glycerin without the intermediate production of a real soap.

This last-named method has gradually been brought to a high state of perfection. At the well-known stearin works of De Milly, in Plaine St. Denis, the operation is conducted as follows:

The fats, contained in closed boilers provided with stirrers, and mixed with a certain proportion of water, are treated with a current of superheated steam at a pressure of 15 atmospheres (225 lbs. to the square inch)—that is, at a temperature of 200° C. (392° F.)—being constantly kept in motion by the stirrer. The excess of steam passes out from the boiler, and finds its way, condensed to water (but still very hot), to spiral tubes contained in a tank filled with aqueous glycerin such as had been obtained in previous operations. By this method the heat remaining in the water of condensation is completely utilized, and the glycerin concentrated. At the same time the condensation of the steam in these spiral tubes constantly attracts a fresh supply of live steam from the steam-boiler. Between the latter and the fat-boiler a pressure regulator is interposed, and, as the steam-boiler is automatically fed to a constant level, the pressure in the fat-boiler is constantly maintained at 15 atmospheres.

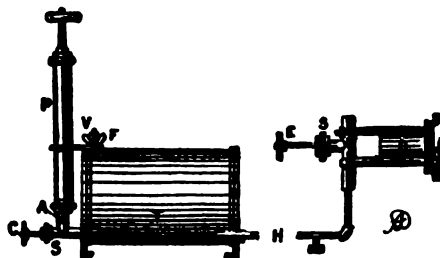
After the separation of fatty acids and glycerin is completed, they are simply separated, the dilute glycerin passed on to the evaporating tanks, and the fatty acids are subjected to distillation. This is now conducted in a much more rapid manner than formerly by injecting into the receiver a jet of cold water under very high pressure, which acts as an aspirator for the vapors of the fatty acids, and at the same time instantly condenses the latter. A single retort can thus yield from seven to eight tons of perfectly white, distilled fatty acids in twenty-four hours. These are then passed on to the presses, where the different acids are separated, the stearic acid (in common parlance often called stearin, though this is chemically a compound of stearic acid and glyceryl) being, of course, the most important.—After *Zeitsch. f. ang. Chem.*, 1890, 39.

Determination of Caustic Soda and of its Carbonate in one Operation.

HUGO GOEBEL recommends the use of two indicators, namely, phenolphthalein and "Poirier's Blue, C. L. B.," for this purpose.

In the first place, by a preliminary trial it is ascertained how much of volumetric acid is necessary to completely neutralize a weighed quantity of the alkali. For the test itself, an amount of acid a little short of this is put into a flask together with one drop of phenolphthalein (1 part dissolved in 90 parts of 90 p. c. alcohol). The liquid in the flask should not measure more than 50 C.c. The alkali is now added to the flask and its complete decomposition accomplished by adding the necessary quantity of volumetric acid from a burette. When the solution has just turned colorless, the amount of acid used corre-

sponds to the quantity of caustic alkali plus one-half of the carbonate present. Next one drop of a solution of the Poirier's Blue (1 in 400 parts of water) is added, and the titration continued until a dark-blue tint appears. The acid consumed in the last operation corresponds to half of the carbonate present. By deducting the latter from the former, the amount of caustic alkali is found; and, by multiplying with 2, the amount of carbonate.—After *Chem. Zeit.*

**A HYDROCARBON FURNACE.**

FROM a paper showing the utility of a hydrocarbon furnace in assaying (and also in various other chemical operations), communicated by Mr. G. E. R. Ellis to the *Journal of Soc. of Chem. Ind.* (December 31st), we take the following:

I have ventured in this paper to give particulars of a piece of apparatus which my own experience, confirmed by that of many other assayers, has shown to be eminently serviceable as a readily controllable source of intense heat, such as is required by analysts, assayers, metallurgists, and others. This furnace has been before the American public for several years, and is therefore past the experimental stage, but, so far as I am aware, it is comparatively or wholly unknown to the English scientist.

Assayers know full well that there are many inconveniences and annoyances necessarily connected with the use of furnaces burning coal or coke; this apparatus, on the contrary, does away with the constant replenishing of fuel, with all dust and ashes, and with a large amount of radiated heat; indeed, it may be said that it possesses all the advantages of a gas furnace with the additional advantage that it may be forced to practically any extent without the use of a blower or foot bellows. Once pumped up—which operation occupies only a few seconds—the blast will continue for a long time without further attention.

The apparatus consists of three parts (each of which may be procured separately), viz., the tank and blowpipe, the muffle furnace, and the crucible furnace. The tank and blowpipe are represented in Fig. 1. P is an ordinary force pump, at the bottom of which, at A, is a valve which closes automatically upon releasing the pressure from the pump; C is a check valve which closes the inlet to the tank T completely; F is a filling screw for introducing the fuel used, viz., gasoline; V is a vent screw for letting off the pressure when the operation or experiment is finished; H is a pipe leading from the tank to the burner D; E is the burner regulator, terminating in a fine point, closing the orifice of the burner; SS are packing boxes. Upon opening C and pumping a few strokes, a pressure is created in the tank and on top of the fluid, forcing it through the tubes of the burner, which, being previously heated, vaporize the gasoline. This issues from the orifice at the end of E as a highly heated gas, and burns as such in the form of a powerful blast. After being once started the heat of the flame, passing through the burner D, vaporizes the fluid in the tubes, and hence the apparatus is automatic.

The air which is forced in is not consumed, so that to keep up the blast it only requires a few strokes of the pump occasionally (every half-hour or so) to maintain the pressure lessened by the consumption of the gasoline.

The way to start the blowpipe is simple, and as follows: Close E, unscrew F, and introduce gasoline according to the capacity of the tank. Replace F, close V, open C one or two turns, and give three or four full strokes of the pump P, then close C. Heat the burner by burning some of the gasoline in a suitable vessel (an old scarfier will do well) placed under the burner; when hot apply a match and open E gradually until the action is more or less uniform. The burner is hot enough when no liquid or spray issues from the orifice; if not hot enough, let the oil burn slowly until no liquid or spray issues. When sufficiently heated, the blast can be made of any desired intensity by the use of the force pump, as above. The mouth of the burner D should be 2 to 3 inches from the inlet of either furnace, otherwise the combustion in the interior of the furnace will not be complete. To stop the action of the blowpipe, simply shut the regulator E or open screw V, or do both. When not in use, keep V open.

For very high temperatures or muffle work we proceed as follows:

1. Light as above and heat inside of furnace to bright redness.
2. Place the burner against the inlet of the furnace.
3. Turn out burner flame with E, and immediately

* We prefer the term "cresotic acid" to that of "cresotinic," in accordance with Fownes, Watts, and other authorities.—Ed. AM. DRUGG.

turn it on again without lighting it (or simply blow the flame out), when, if the furnace is hot enough, the gas will light *inside* the furnace. When burning inside the furnace, there must be no flame in the burner tube. The heat can be regulated by the use of E and P.

The tanks are made in two sizes; one contains half a gallon of oil, the other one gallon, and cost (with blow-pipe complete) at Chicago, respectively, \$23.00.

Delicate Copper Reagent.

THE yellow coloration of a sample of distilled water answering to the ordinary tests when potassium iodide was dissolved in it, was found, by means of potassium ferrocyanide, to be due to minute trace of a cupric salt, the reaction apparently consisting in reduction of the cupric salt and formation of cuprous iodide (*Pharm. Centralh.*, January 16th, page 32). This reaction proved to be extremely delicate. A 1 in 10,000 aqueous solution of cupric sulphate gave with ammonia a scarcely perceptible blue tinge; treated with an equal quantity of 1 in 20 potassium ferrocyanide solution, after dilute acetic acid had been added, it gave a distinct brown color; whilst with an equal quantity of 1 in 10 solution of potassium iodide it gave a distinct yellow color. At 1 in 200,000 the reaction of potassium ferrocyanide was no longer perceptible, but potassium iodide produced a faint yellow that was changed to violet on the addition of a few drops of starch mucilage. At 1 in 500,000 the yellow color could no longer be seen, but there was still a distinct violet coloration when starch was added. The original contamination is attributed to the dropping of some particles of fat into the boiler, the volatile fatty acid from which is supposed to have passed over with the steam and attacked the copper condenser.—*Pharm. Journ.*

Specific Gravity of Methylic Alcohol.

FROM a new table of specific gravities of wood alcohol determined and calculated by W. Dittmar and Charles A. Fawsitt (*Transact. Roy. Soc. Edinb.*, 33, ii., 509; *Zeit. f. anal. Chem.*, 1890, 82), we select those figures which are most generally needed for practical purposes.

The specific gravities are given on the basis of water at 4° C.

Per cent CH ₃ O.	Specific gravity at 60° F.	Per cent CH ₃ O.	Specific gravity at 60° F.
0 (pure water).	0.99907	90	0.82896
10	0.98262	91	0.82128
20	0.96808	92	0.81849
25	0.96093	93	0.81572
30	0.95355	94	0.81298
40	0.93897	95	0.81018
50	0.91855	96	0.80781
60	0.89798	97	0.80448
70	0.87487	98	0.80164
75	0.86290	99	0.79876
80	0.85085	100	0.79589
85	0.83788		

Purification of Alcohol for Laboratory Uses.

PROF. E. WALLER makes the following communication to the American Chemical Society:

Comparatively recently several papers have appeared on the subject of the reactions of potassium permanganate with alcohols, and the impurities which they may contain.*

In preparing alcoholic solutions of caustic alkalies, and also of silver nitrate (for fat tests, etc.), I have been annoyed, as have other chemists, by the unsatisfactory character of the solutions obtained, in consequence of the presence of impurities in the alcohol bought for laboratory use. I find also that most alcohol of 93 per cent, when kept in tin cans, slowly reacts on the tin, giving, after a while, a cloud of SnO₂, which is too fine to filter out, and renders purification by distillation necessary. In the light of the results obtained by the writers above alluded to, I have adopted the following method for the purification of my alcohol, on which I ask the criticism of the members of the Society:

A convenient amount of the alcohol to be purified is shaken with pulverized potassium permanganate until it assumes a decided color. It is then allowed to stand for some hours until the permanganate has been decomposed and brown manganese oxide is deposited. A pinch of pulverized calcium carbonate is then added, and the alcohol distilled at the rate of about 50 C.c. in twenty minutes from a flask provided with a Wurzel tube or one of the Lebel-Heninger pattern. The distillate is tested frequently until about 10 C.c. thereof, when boiled with 1 C.c. of strong (syrupy) solution of caustic soda or potash,

give no perceptible yellow coloration on standing for twenty minutes or half an hour. What distills over after that time is preserved for use.

The first distillates may be added to the small amount remaining in the distilling flask (which should not be driven down to complete dryness), and a fresh portion of purified alcohol recovered.

The rationale of the proceeding appears to be that the permanganate oxidizes and destroys chiefly the fusel oil, furfural, and other compounds of that nature, the acids resulting from the reaction are neutralized by the calcium carbonate added before distillation, and by distilling slowly the aldehyde, at least, is concentrated in the first portions of the distillate. Distillation of alcohol containing caustic potash or soda seemed to cause a constant formation of aldehyde. The alcohol thus purified is perfectly neutral, and gives most satisfactory results when used as a solvent for caustic alkalies or silver nitrate, the solutions remaining as colorless as distilled water, even after boiling and standing indefinitely, if properly protected from dust and other external influences.—*Journ. Am. Chem. Soc.*

The Weight of Water.

SCIENCE is correcting itself in the department of weights and measures. It is now discovered that an imperial gallon of water, according to the capacity hitherto prescribed for it, does not weigh 70,000 grains, and consequently it is incorrect to say that "a pint of water weighs a pound and a quarter," unless we allow an increased volume for the pint. The correction to be made is not much; but still it is something.

In June, 1824, an act of Parliament was passed, coming into operation on January 1st, 1826, which was thought to settle this matter once for all.

In that statute it was declared that if the imperial pound, as represented by a brass weight in the custody of the clerk of the House of Commons, happened to be lost, defaced, or otherwise injured, it should be restored by comparison with a cubic inch of distilled water, weighed in air by brass weights, at the temperature of 62° F., the barometer being at 30 inches. Such cubic inch of water was stated to be equal to 252.458 grains, the standard troy pound being 5,760 such grains, and the avoirdupois pound 7,000 such grains troy.

The gallon was specified as the standard measure for capacity, and was to be equal in bulk to 10 pounds avoirdupois of distilled water, weighed in air in the manner already described.

The capacity of the imperial gallon thus became 277.274 cubic inches, representing 70,000 grains. In like manner a cubic foot of water was reckoned to weigh 62.321 pounds avoirdupois. The same standard in respect to the cubic inch, and consequently the cubic foot, was adopted in the Sale of Gas Act of 1859. But a report from the standards office of the Board of Trade has just been issued, by which it appears that experiments have been in progress in the department since the year 1878 with a view to ascertain "what is the true weight of a cubic inch of distilled water."

It is shown that the law passed in 1824, regulating the weights and measures, was in reality based on weighings made as far back as 1798. In 1870 there were distinct differences among scientific authorities as to the true weight of a given volume of water, and it was for this reason that it was deemed inadvisable to re-enact in the Weights and Measures Act of 1878 so much of the act of 1824 as fixed the weight of the cubic inch at 252.458 grains.

The experiments at the standards office have now at last landed us in the conclusion that water is not quite so heavy as the act of 1824 declared it to be, the cubic inch being only equal to 252.286 grains.

The excess is only about one-sixth of a grain in a cubic inch, but a "note" attached to the report specifies the old estimate as "erroneous for scientific purposes," and it is suggested that in any future legislation on this subject it may be desirable to consider whether the new value for the cubic inch might be substituted for the old and incorrect one.

It is of some interest to observe how far the new value affects the old reckoning. Water is a shade lighter than we thought it to be, so that we lose nearly 48 grains in a gallon, the 70,000 grains giving place to 69,952; or else we must give the gallon greater capacity.

In a cubic foot of water we lose 297 grains, or nearly three-quarters of an ounce. The pint, considered as the eighth part of 277.274 cubic inches, drops from 8,750 grains to 8,744, creating a loss of 6 grains, or, more correctly, 5.96.

The excess has not been much, and yet it is to be regretted that the matter was not set right at first. It seems curious that a problem so close to our hands should have remained so long unsettled.

When the measurement relates to the distance of the earth from the sun, we expect to find that the earlier calculations are susceptible of correction. But most of us thought that we had a firm foundation in the table of weights and measures.

It proves that the weight of a cubic inch of water was

* Habermann, *Fres. Ztschr. anal. Chem.*, xxvii., 668; Roese, *ib.*, xvii., 385; Caseneuve, *Bull. Soc. Chim. (Paris)* [8] 1., 700. See also *Dingl. Polyt. Jour.*, cclxxiii., 374.

overestimated. Consequently, the number of cubic inches corresponding to 10 pounds of water was underestimated, and the gallon was made proportionately too small, together with all the derived measures. Still, to do our scientists credit, we must remember that the error in this case is less than 1 part in 1,400. When Sir J. Herschel was defending the character of astronomical science, in view of an error of nearly 4,000,000 miles in estimating the sun's distance, the correction was shown to apply to an error of observation so small as to be equivalent to the apparent breadth of a human hair at a distance of 125 feet, or a sovereign 8 miles off. Moreover, the error had been detected by the astronomers themselves, and the needful correction applied. It happens that another correction has been made since that date, as recently as a year ago, showing that the error in regard to the sun's distance was not as great as the distinguished astronomer supposed.

So by degrees we get to the truth, and may be supposed now to know the real weight of distilled water. The correct observation of common things is not so easy as many people suppose, and difficulties unknown to the multitude beset the path of absolute accuracy. It needed the mechanical genius of Sir Joseph Whitworth to produce so seemingly simple a thing as a perfect plane, which everybody thought was actually accomplished before.

The table of our weights and measures has now to be amended to this extent, that a gallon of water weighing 10 pounds requires a capacity of 277.463 cubic inches instead of 277.274,* the enlargement being rather less than one-fifth of a cubic inch. The capacity of the pint becomes 34.683 inches instead of 34.659. The difference in the cubic foot we have already noticed.—*The Engineer.*

Dicotoin (C₁₁H₁₅O₁₁); Cascarin; Hedyosmin; Asepsin; the bitter of *Brownea grandiceps*; the derivative of *Iboga vateriensis*; Guiana-bark tannin; the alkaloid of Scopola-rhizome, Mandragorin, Lobeline, Bitartrate of Nicotine (C₁₁H₁₅N₂O₁₁), Bitter Almond Oil and Amygdalin from seeds of *Lucuma mammosa*, ethereal oil from *Cinnam. citriodor.*, and Luridinic acid. Many of the above mentioned principles have, so far, not been described at all, or, if mentioned, only treated superficially, in the available literature. Hence, in some cases, it is doubtful whether they are alkaloids or neutral principles.

The Determination of the Diastasic Power of Extract of Malt.

CONSIDERABLE importance is attached to the estimation of the digestive power of extract of malt upon starch; it is therefore very strange that published results should show such extraordinary differences; e.g., Messrs. Dunstan and Dimmock (who were, I believe, the first to introduce a ready method for making this determination) state that the best malt extracts of the market should completely digest one-seventeenth of their weight of starch in several (three ?) hours (*Pharm. Journ.* [3], ix., page 733; *AM. DRUGG.*, 1884, 97, 203). Carl Jungk, in a paper in the *American Journal of Pharmacy*, June, 1883 (*Pharm. Journ.*, xiv., page 104; *AM. DRUGG.*, 1884, 203), describes a method whereby the effect of malt extract upon starch mucilage is tested at intervals of one minute, and says that good extract of malt should convert its own weight of starch within ten minutes at 100° F. Later still (*Pharm. Journ.*, xv., page 236) T. S. Dymond compares the two

	0.05 GRAMME.				0.1 GRAMME.			0.5 GRAMME.			
	5 minutes.	15 minutes.	30 minutes.	45 minutes.	5 minutes.	15 minutes.	30 minutes.	5 minutes.	10 minutes.	15 minutes.	30 minutes.
Arrowroot...	Done.....	.....	.....	.....	Done.....	.....	.....	Bright brown.	Pale brown.	Done.*	.....
Maize.....	Bluish..	Bluish..	Done.....	.....	Indigo ..	Indigo blue.	Violet...	.....	.....	.....	Clear blue.‡
Potato.....	Done.....	.....	.....	.....	Done.....	.....	.....	Bright brown.	Pale brown.	Done.†	.....
Rice.....	Bluish....	Pale blue.	Done. ....	.....	Blue.....	Bluish....	Pale violet-brown	.....	.....	.....	Clear violet.‡
Wheat ...	Brownish-violet.	Violet-brown.	Violet tint.	Very pale violet.	Brown-violet.	Violet....	Purple...	.....	.....	.....	Clear violet.‡

* Completed in twelve minutes.
† Completed in twelve and one-half minutes.
‡ These colors (blue and violet) refer to the liquid five times diluted; the color was too deep to be seen before solution.

Rare Plant Derivatives, etc.

At the sixty-second meeting of the "Deutsche Naturforscher und Aerzte" Dr. Theodor Schuchardt, of Görlitz, exhibited a very notable collection of chemical preparations and drugs, a list of which has kindly been sent us by Messrs. Lehn & Fink, of New York. The list is too long, notwithstanding its interesting character, to reproduce here, and embraces 15 inorganic preparations, 14 of the fat series, 39 of the aromatic compounds, 62 plant derivatives, and 85 crude drugs. At our request Messrs. L. & F. have added to the list the prices, per ounce, for which the plant derivatives can be bought.

Antiarine, C ₁₁ H ₁₅ O ₁₁ + 2H ₂ O	Hyenanchin.....	\$15.00
Arecaïne, C ₇ H ₁₁ NO ₃ + H ₂ O	Hydrocotoin, C ₁₁ H ₁₅ O ₁₁ ..	4.50
Arecolin, C ₈ H ₁₁ NO ₃ ..	Kawain.....	4.50
Aribine chlorhydrate, C ₁₁ H ₁₅ N ₂ , 2HCl.	Leucotin, C ₉ H ₁₃ O ₁₁	15.00
Asaron.....	Leucodendrin.....	1.50
Acid, drumicinic.....	Lobeline sulphate.....	5.00
embelic, C ₈ H ₁₁ O ₁₁	Mandragorine sulphate (C ₁₁ H ₁₅ NO ₃) ₂ H ₂ SO ₄	9.00
gymnemic, C ₈ H ₁₁ O ₁₁	Nerine.....	12.00
O ₁₁	Oxyleucotin, C ₉ H ₁₃ O ₁₁ ..	50
vulpic, C ₈ H ₁₁ O ₁₁	Oleandrin.....	6.00
Chelidonine, C ₁₇ H ₂₃ N ₂ O ₁₁	Ouabaine, C ₂₉ H ₄₃ O ₁₁ ·7H ₂ O	10.00
Choline, C ₁₇ H ₂₃ N ₂ O ₁₁	Paracotoin, C ₁₁ H ₁₅ O ₁₁	4.00
Cotoin, C ₁₇ H ₂₃ N ₂ O ₁₁	Proteacin.....	1.75
Curarine, C ₁₁ H ₁₅ N.....	Santaline.....	85
Drumine.....	Santoninnoxim, C ₁₁ H ₁₅ NO ₃	7.50
Emodin, C ₁₁ H ₁₅ O ₁₁	Strophanthin (hisp.).....	2.00
Erythrophloeine.....	" (asper).....	2.25
Fraxetin, C ₁₀ H ₁₄ O ₁₁	" (glaber).....	4.00
Fraxine, C ₁₁ H ₁₅ O ₁₁	Strophanthidin.....	6.00
Harmaline, C ₁₁ H ₁₅ N ₂ O ₁₁	Strophanthinol.....	75
Herniarine, C ₁₁ H ₁₅ N ₂ O ₁₁	Stylophorine hydrochl... ..	2.00
Hernine, C ₁₁ H ₁₅ O ₁₁	Sulamine.....	7.50
Hurine.....	Talamine.....	10.00
	Wrightine.....	7.50

Besides the above-named substances the following were shown, but they are simply pharmaceutical curiosities and not to be found in the market:

* Regarding this figure see Oldberg's "Weights and Measures" (2d ed.), page 87, note. If the amended weight pointed out in the paper proves to be correct, then the United States gallon will contain 231.15746 cubic inches instead of 231.—*En. Am. Drugg.*

methods above referred to, and, after condemning Jungk's method, states that a good malt extract should completely digest one-fifteenth of its weight of starch in half an hour at 140° F. [Another method of assaying extract of malt will be found in *AM. DRUGG.*, 1886, 119.]

I think the key to these divergences will be found in the experiments recorded above. It is evidently not in the fact that malt extract has improved during late years, for Mr. Dymond's experiments are of later date than those of Herr Jungk. Nor do I think that the English-made extracts of malt are inferior to those of foreign manufacture, as might be suggested by the low results of the English experimenters; on the contrary, from the experience of large numbers of determinations, I am strongly of opinion that (generally speaking) English extracts are distinctly superior to either American or German ones.

In the first place I will describe the method I am in the habit of using, for which I do not claim any originality, it being simply a modification of the foregoing processes:

1. Prepare a mucilage by mixing 1 Gm. of potato starch or arrowroot (dried in an oven at 212° F.) with 10 C.c. of cold water, add 100 C.c. of boiling water, and boil the whole for half an hour; allow to cool to about 100° F., and make up the measure to 100 C.c.
2. Dissolve 5 Gm. of the sample of extract of malt in water sufficient to produce 50 C.c. of solution.
3. Dissolve 0.1 Gm. iodine in 100 C.c. of water by the aid of 0.2 Gm. of iodide of potassium; 50 C.c. of starch solution are introduced into a flask or bottle, and kept in a water-bath at a temperature of 98° to 100° F. until it has attained that temperature, when 5 C.c. of the malt solution are added (also at 98° to 100° F.), gently shaken to mix thoroughly, and replaced in the water-bath; after five minutes and at intervals of five minutes (or less if desirable) 4 C.c. of the liquid are poured into a test tube containing 1 C.c. of the iodine solution. A good extract of malt will give no indication of starch or dextrin after ten, or at most fifteen, minutes, while one which still gives a distinct coloration after thirty minutes should be rejected as quite unfit for use; that is, *extract of malt should completely digest its own weight of potato starch in ten to fifteen minutes at 98° to 100° F.*

It will be remarked that I have selected potato starch or arrowroot for this test, other starches giving widely differing results. The accompanying table will indicate the importance of using one or other of these kinds of starch, and, as mentioned above, probably suggests an explanation of the widely differing results of other observers.

The different mucilages were all prepared as described above, and quantities of mucilage representing 0.05, 0.1, and 0.5 Gm. of each starch (dried) introduced into the bottles, the bulk of each being made up to 50 C.c. with distilled water, and 0.5 Gm. of extract of malt added to each.

—R. A. CRIPPS in *Pharm. Journ.*, December 21st, 1889.

Brown-Sequard's Mixture for Epilepsy.

Sodium Bromide.....	180 gr.
Potassium Bromide.....	180 "
Ammonium Bromide ..	180 "
Potassium Iodide.....	90 "
Ammonium Iodide.....	90 "
Ammonium Carbonate.....	60 "
Tincture of Calumba.....	1½ fl. oz.
Water.....	8 " "

Dose: 1½ drachms before meals and 3 drachms at bedtime.

Pate Dentifrice.

Precipitated Chalk.....	150 parts.
Powdered White Soap.....	150 "
Powdered Orris Root.....	50 "
Carmine.....	2 "
Oil of Peppermint.....	15 "
Oil of Cinnamon.....	25 "
Glycerin.....	a sufficiency.

Dissolve the carmine in a little solution of ammonia, and mix it well with the chalk and orris root; then add the soap and the essential oils, mixing the whole thoroughly in a mortar, and sifting to insure thorough division of the oils and the coloring matter. When this is done return the powder to the mortar, and make into a hardish mass with glycerin. The mass is now to be formed into cakes, and may be put up in tiny porcelain jars.

An alternative flavoring compound is composed of oil of peppermint, 10 parts; oil of lemon, 10 parts; and oil of cinnamon, 5 parts. The "Pâte" may be rendered "antiseptic" by the addition of 1 per cent of oil of thyme dissolved in a sufficiency of rectified spirit. Salicylic acid should not be used, as it combines with the chalk and so loses much of its value. After the cakes have been moulded they may be hardened by exposing to gentle warmth, and a polish given to the surface by light rubbing with a soft cotton cloth.—*Chem. and Drugg.*

Oil of Birch and Oil of Wintergreen were reported in August last by Messrs. Trimble and Schroeter to be physically and chemically identical, both consisting mainly of methyl salicylate with the addition of a hydrocarbon having a formula of $C_{11}H_{14}$, together with small quantities of benzoic acid and ethyl alcohol. They also stated that a sample of artificial wintergreen oil examined by them contained the properties neither of the natural oil nor of methyl salicylate. In reply to this, Dr. Power reports the examination of a number of samples, showing that natural wintergreen oil consists of methyl salicylate and 0.3 per cent or less of laevogyrate terpene; that oil of birch, when pure, consists simply of methyl salicylate, and is inactive towards polarized light; and that neither contains benzoic acid nor, so far as he has been able to satisfy himself, any ethylic alcohol. [In the January number of the *Am. Jour. of Pharm.*, Messrs. Trimble and Schroeter defend their position and combat some of these statements. —ED. AM. DRUGG.]—*Pharm. Journ.*

Anhydrous Sulphite of Potassium.—The crystalline sulphite of potassium ($K_2SO_3 \cdot 7H_2O$) contains 7 molecules of water, and is rapidly altered on exposure to air, losing water and becoming gradually oxidized to sulphate of potassium. The well-known firm of Kahlbaum (Berlin) now puts the salt on the market in an anhydrous condition. In this form it is perfectly stable.

It would be of advantage to have sulphite of sodium in the same anhydrous form.

Credit to the Druggist.—Dr. G. H. Peirce, of Danbury, Conn., writing to the *New England Medical Monthly*, says: When a druggist can wrestle with prescriptions like the following, and neither himself nor the patient get downed, we think he deserves a credit mark. The following prescription was handed me the other day by one of our drug clerks, who had kept it, not on "file," but for curiosity's sake:

DANBURY, CONN.

MR. R. Please send me 15c. of grose of sulperment and 10c. purselen powder and please make the mint as strong as you can as I want to put it on the walls.

MRS. M.

Now this, in correct vernacular, should read: fifteen cents' worth of corrosive sublimate and ten cents' worth of Persian insect powder, etc.

Vaseline Ointments may be emulsified quickly by adding water and eight drops of castor oil to each drachm of the ointment, and triturating. This is said to be especially serviceable in the case of ointments, with a petrole basis, which contain iodine or iodide of potassium, etc., as it prevents their decomposition.—*Drugg. Bull.*

Benzoate of Mercury is prepared by Mr. Bourquelot as follows: Dissolve 125 parts of oxide of mercury in 250 parts of nitric acid of 1,020° with the aid of gentle heat; add 4,000 parts of water, and filter. Also dissolve 188 parts of benzoate of sodium in 4,000 parts of water, and filter. Mix the two solutions slowly while stirring. This gives a bulky precipitate, which should be collected on a cloth and carefully washed with cold distilled water. The preparation is then pressed and dried with gentle heat, and yields a white powder, sparingly soluble in ether, alcohol, chloroform, or water, but easily soluble in a watery solution of common salt. It does not precipitate albumen, and may, consequently, be employed hypodermatically. With alcohol or ether the benzoate turns yellow, being transformed into the basic salt.—*Drugg. Bull.*

Creosote and Iodoform.—Barthélemy's formula, for use in cases of consumption, is:

Iodoform (powdered).....	2 Gm.
Creosote.....	3 "
Balsam of Tolu.....	5 "
Benzoin (powdered).....	5 "
Glycerin.....	8 "

The creosote and iodoform are first mixed, the glycerin added, and the whole is then to be triturated for two minutes, after which the balsam and benzoin are added.—*Drugg. Bull.*

Gelatinous Bottle Wax for Covering Corks.—In storing volatile liquids which are solvent of resinous material, the ordinary bottle wax in which bottle necks are commonly dipped is generally inadmissible by reason of this solvent action of the liquid upon it. In such cases the following answers admirably, giving a perfect closing; and, moreover, the top is easily pared off with a knife when the bottle is to be opened:

Soft Gelatin or good Glue.....	8 parts.
Water.....	9 "
Glycerin.....	2 "

Melt the gelatin in the water and then stir in the glycerin. Any coloring matter can be added, and the bottle necks should be quite free from grease. A second dip can be given if requisite, and the top can be stamped while soft with a slightly greased metal seal, or warm stereotype (slightly oiled), or an india-rubber stamp.—*Photo-Review.*

Anti-Catarrhal (or Cold) Pills.—Dr. S. S. Cohen, of Philadelphia, recommends as a remedy for ordinary catarrhal colds a compressed tablet containing three grains each of salol and terpine hydrate—one or two to be taken every second, third, or fourth hour, according to indications.

Chocolate Syrup for Soda Fountains.—The following is said by L. G. Heinritz to be superior in strength and flavor to those made with the prepared chocolate or extracts now in the market:

Confectioner's Chocolate.....	½ pound.
Hot Water.....	2 quarts.
Condensed Milk.....	1 can.
Granulated Sugar.....	5 pounds.
Whites of two Eggs,	
Extract of Vanilla.....	1 ounce.
Gum Foam.....	1 ounce.

Cut the chocolate finely into a porcelain-lined evaporating dish, and with the aid of heat and a pestle reduce the chocolate to a smooth paste. Add the water (boiling hot) gradually, stirring constantly; then stir in the condensed milk and sugar until both are dissolved. When cold, skim off the cocoa butter, particles of chocolate, etc., add the beaten white of eggs, vanilla, and gum foam, and strain through muslin. Confectioner's chocolate costs from twenty-eight to thirty-five cents per pound, and the cost of the entire materials is about ninety-five cents per gallon.—*N. E. Druggist.*

Creosote Pills.—A correspondent of *L'Union Pharmaceutique* has tried the various propositions for making creosote pills, and regards that made by Mr. Martindale, of London, the best:

Creosote,	
Neutral [Castile] Soap, powd.....	aa equal parts.

Introduce them into a wide-mouthed flask, cork, and agitate well. Digest on a water-bath until the mass is melted, then allow to cool. It contains, of course, one-half its weight of creosote.

This mass mixes easily with any other substance and without decomposition. The soap must be neutral and dry. If not available in a dry and powdered condition, Castile soap may be melted in a solution of salt, separated by cooling, then rasped, dried by heat, and powdered.

Lanolin as an Ointment Base.—H. Helbing, in view of the viscosity of lanolin, suggests the following compound as better suited as an ointment base than lanolin by itself:

Anhydrous Lanolin.....	65 parts.
Liquid Paraffin.....	80 "
Ceresin.....	5 "

Melt together and incorporate 30 parts of water by beating.—*Pharm. Jour.*

Bordet's Hair Tonic consists of the following:

Carbolic acid, tincture of cantharides, each 30 minims; tincture of nux vomica, f. 3 ij.; compound tincture of cinchona, f. 3 i.; cologne water, f. 3 i.; cocoanut oil, enough to make f. 3 iv.

This is to be applied to the scalp twice daily with a small sponge.

Transparent and Permanent Collodion.—A correspondent of the *Druggists' Bulletin* says that a transparent collodion is in use in Paris which is not only perfectly clear, but remains limpid for an indefinite time. It is prepared by shaking an official collodion with quartz sand which has previously been washed and carefully calcined. The action is purely mechanical, the suspended particles adhering to the grains of sand and settling to the bottom of the container in a gelatinous mass.

Testing Chemical Reagents.—The methods given by Krauch ("Die Prüfung der chemischen Reagentien auf Reinheit"; see this journal, 1889, page 92) for testing the purity of copper oxide are insufficient, as commercial copper oxide frequently contains lime, an impurity which would give rise to considerable errors in analyses. A sample of the granulated substance was found to contain 0.39 per cent and a sample of the powder 1.02 per cent of calcium oxide. Lead chromate contains lead oxide; in one sample examined 13.27 per cent of lead oxide was found.—M. v. NENCKI in *Monatshefte*, 10, 233, and *J. Chem. Soc.*

Foreau's Syrup.—The physician of Napoleon the First is said to have prescribed the following for the sudden attacks of hoarseness with which the emperor was often affected:

Liq. Ammonii fortioris	℥x.
Syr. Erysimi.....	3 iss.
Infus. Tiliæ Flor	3 iiss.

M. To be taken as one dose.

Erysimum officinale (*Sysimbrium offic.*), or hedge mustard, is a small annual growing almost everywhere in the United States and Canada. The infusion of linden (tilia) is used simply as an agreeable vehicle, and may be replaced by any other pleasant vehicle.—*St. Louis Med. and Surg. Jour.*

Absorbent Cotton.—A French mode of preparing absorbent cotton is said to yield a better product than is commonly found here. Carded cotton is first immersed in boiling water rendered alkaline with soda or potash. It is then pressed and placed in a five-per-cent solution of chloride of lime, after which it is washed with pure water and plunged into water slightly acidulated with hydrochloric acid. Finally it is washed with pure water and air-dried.—*Drugg. Bull.*

Petroleum in India.—The *Delhi Courant* states that search for petroleum along the banks of the Lapan River, in Langkat, has resulted in the discovery of large deposits of that oil. Raw petroleum oozes out of the ground at many places, where the natives have consequently dug pits. The output from most of the latter has never been considerable, and shows fluctuation. At Telaga Tunggal, where the boring reached a depth of about 350 feet, more important results have been arrived at. Appearances indicate that the main reservoir has been tapped there. The oil met with in the other pits and deposits proved to have found its way above ground from that storing place. The oil tested yields 35 per cent of lamp oil of good quality. It does not contain harmful ingredients, and offers advantages as a lubricator. The exact depth of the other deposits remains to be determined before an estimate of working expenses can be accurately made.

Strychnine for Inebriety.—The excellent results which several authors obtained with strychnine in the treatment of inebriety induced Dr. Taroschewsky to undertake a series of experiments with a view of studying the antagonism between strychnine and alcohol. The results of these experiments are published in the *D. Med. Ztg.*, and the author arrives at the following conclusions:

1. Strychnine undoubtedly neutralizes the toxic and narcotic effects of alcohol.

2. Prolonged administration of strychnine and great quantities of alcohol combined is not followed by the pathological changes in the tissues which invariably appear when alcohol alone has been given for any length of time.

3. There are, of course, some limits for this protecting action of strychnine, and the prolonged use of strychnine itself may do harm.

4. In all cases of alcoholism strychnine ought to form the essential element of medical treatment.

5. Strychnine may also be considered the most powerful prophylactic against alcoholism.—*Br. and Col. Druggist.*

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EDITORIAL.

THE question has repeatedly been put to us whether it is not possible to make a compromise between the advocates of the champions of the system of "parts by weight" and those who advocate the use of definite weights and measures, by giving, in the Pharmacopœia, with each working formula, the required quantities in both systems. One of our correspondents (see Query 2,416 in this number), who has put in a plea in favor of this method, points to the British Pharmacopœia, where—as he says—this very method has been introduced. That our correspondent has misunderstood the matter will appear further on.

We have given this question a good deal of attention, and may assist in clearing up some doubts regarding its solution. In the preparation of the "Report on the Revision of the U. S. Pharm., preliminary to the Convention of 1880," etc. (8vo, New York, 1880), many of the working formulæ of the Pharmacopœia of 1870 are given, side by side, in the old weights and measures, translated into the exact equivalents in parts by weight, and these equivalents rounded off to convenient figures. On examining the whole series, it will be found that the proportions as established by the rounded-off figures, while in most cases not very materially deviating from the exact equivalents, yet are so far different that two products—one made after the first formula, by actual weight and measure, and the other, by the rounded-off proportions, in parts by weight—will not be identical. It is, of course, well understood that in the majority of cases—for instance, in tinctures, mixtures, syrups, etc.—this discrepancy would probably not be greater than that found in two products made by two different operators, by one and the same process, from materials which are unavoidably varying in their composition.

But can the Pharmacopœia sanction the use of two alternate formulæ for one and the same preparation when it is known beforehand that these formulæ cannot produce identical products? Manifestly not. We do not think that any arguments will or can be advanced in favor of introducing doubt or uncertainty into the Pharmacopœia designedly. The progress of science in all departments constantly reveals new facts, which render corrections necessary in pharmacopœial descriptions and directions, and it is our duty to eliminate all doubtful,

uncertain, and incorrect statements, but not to introduce any knowingly. Exact equivalents for parts by weight may, of course, be calculated in actual weights and measures, but the proportions would be so unwieldy or delving into fractions that they would become practically useless.

If our system of weights and measures were like the English, in which weights are commensurate with measures, the difficulty would be less. But even then it would be next to impossible to obtain simple proportions in converting parts by weight into actual weights and measures.

In the British Pharmacopœia, the term "fluid part" stands as a synonym for the measure or volume of a weight of water corresponding to the weight substituted in practice for "part" in any given formula. For instance, *Cataplasma Lini* is directed to be prepared by the following formula:

Linseed Meal.....	4	oz. or 2	parts.
Boiling Water.....	10 fl. oz.	or 5 fluid	parts

We can prepare this either by the definite weight-and-measure formula first given, viz., by mixing 4 av. oz. of linseed meal with 10 fl. oz. (Brit.) of boiling water; or, supposing we wish to make a larger quantity, we can substitute, for instance, the word "pound" for "part," when the formula becomes:

Linseed Meal.....	2 pounds av.
Boiling water.....	a volume equal to 5 pounds av. of water,

but this volume is half an imperial gallon, or 4 pints of 20 fl. oz. each, each fluidounce corresponding to a weight of 437.5 grains of water. Since the imperial ounce and pound, by measure and by weight, are commensurate with each other, the English pharmaceutical profession has made but little complaint against the introduction of the "fluid parts," which have, without introducing discrepancies, been given as alternatives in many formulæ.

In our judgment, then, it is impracticable to introduce alternative formulæ into our Pharmacopœia except, in a few cases where chemicals are directed to be produced which are capable of being assayed. And we have no doubt that those who have given any serious thought to this subject will arrive at the same conclusion.

THE preface to the second part of the "Digest of Criticisms on the U. S. Pharmacopœia, Sixth Decennial Revision," contains two provisional lists—(1) of articles recommended to be dropped in the next revision, and (2) of articles recommended to be introduced. In some quarters these lists have been interpreted as being prepared and published as the deliberate and official selection of the present Committee of Revision. This is a mistake, as will be readily seen if the preface is carefully read. The two lists were made up by the chairman of the Committee from materials which had come into his hands, either in response to inquiries or unsolicited, and they do not pretend to do more than to form a rough basis for suggestions and criticisms. It was deemed advantageous to give an opportunity to produce testimony in favor or against the retention or acceptance of the several substances enumerated, at as early a time as possible, so that the next Committee of Revision may be able to start work on known data.

IT was recently stated by a New York daily paper that a wholesale firm in this country, failing to import sophisticated opium owing to the standard of morphine strength enforced by the customs officers, have brought over a Turkish expert, and are engaged in adulterating opium that has passed the customs inspection.

E. Schering, the well-known founder of the chemical works formerly bearing his name, and subsequently enlarged to a stock company under the firm name "Chemische Fabrik auf Aktien (vormals E. Schering)," died at Berlin on December 27th, 1889, at the age of sixty-six years. He was a man of remarkable resources, enterprise, and ability, and his loss will be long felt by those who were associated with him in business.

Dr. G. Kerner, for many years the manager and latterly a director of Zimmer's Quinine Works, at Frankfort-on-the-Main, Germany, died suddenly on the 9th of February. As the originator of "Kerner's test" for cinchona alkaloids, and as a manufacturer of cinchona products, his reputation is world-wide.

Supplement to the British Pharmacopœia.—In accordance with an invitation from the Pharmacopœia Committee of the British Medical Council, the Pharmaceutical Society at a recent council meeting appointed, as a committee to assist in the preparation of the proposed Addendum to the British Pharmacopœia, the following gentlemen, viz.: The President, Mr. C. Umney; vice-president, Mr. Alexander Bottle; Dr. Inglis Clark, Mr. Charles Ekin, Mr. Samuel Gale, Mr. H. G. Greenish, Mr. N. H. Martin, and Mr. W. Martindale.

Pharmacopœial Supplement.—The German Apothecaries' Association proposes to publish a supplement to the forthcoming German Pharmacopœia which is to embrace all that is known of value regarding recently announced chemicals and vegetable preparations. The *Druggists' Bulletin* of Detroit suggests that our next revision committee should provide something of corresponding character.

Austriacum, the new element which Dr. Brauner discovered last year in association with tellurium, has also been found by Dr. Anton Grünwald. At least Dr. Grünwald has found in tellurium, antimony, and copper a hitherto unknown element, X of Mendeleef's eleventh series. It is related to tellurium and to bismuth, and in his communication to the Imperial Academy of Sciences the author says it is probably identical with "austriacum."—*Chem. and Drugg.*

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,413.—Granular Effervescent Salts (A. B.).

We are not aware of the existence of any work, large or small, which treats of the preparation of granular effervescent salts in a detailed manner. Most writers who have treated this subject give only general directions, based upon limited experience. Those who have made a specialty of the subject, and who have, no doubt, discovered many important improvements in practical manipulation, have preferred to keep these details to themselves.

No. 2,414.—Literature on Perfumery (E. N. L.).

The work which you inquire about is probably the following, though this appeared, not in 1889, but in 1888: "Die Riechstoffe, und ihre Verwendung zur Herstellung von Duftessenzen, Haarölen, Pomaden, Riechkissen," etc. [6th ed.], von Dr. St. Mierzinski. [70 illust.] 8vo, Weimar, 1888. The translation of the above title is "Odorous Substances, and their Use in the Preparation of Aromatic Essences, Hair-oils, Pomades, Sachets," etc. We have given several extracts from this work in our volume for 1888.

No. 2,415.—Luminous Paint (H.).

Your letter was, for some unknown reason, delayed.

What is understood under "luminous paint" are certain metallic compounds which have the property of being more or less luminous and "phosphorescent" in the dark, after having been for some time exposed to the light. There are many compounds occurring in nature which possess this property, among them a whole series of native minerals, and even, though in a minor degree, such substances as tartaric acid, gum arabic, nitrate of potassium, borax, etc.

But for technical purposes the sulphides of certain metals have been found more suitable than anything else. To a large extent, the commercial luminous paint consists of sulphide of calcium, prepared by heating burnt oyster shells with sulphur in a covered crucible.

We refer you, for detailed information regarding this subject, to Karmarsch und Heeren, "Technisches Wörterbuch" (by Kick and Gintl), vol. v., page 384 ("Leuchtsteine").

No. 2,416.—Alternative Formulæ in the U. S. Pharm. (O. G. W.).

This correspondent recommends to construct the working formulæ of the U. S. Pharm. on the plan of the scheme shown below, in which both parts by weight and actual measures and weights are given. The scheme is as follows:

Tinctura Rhei Aromatica.

20 parts	Rhubarb	6½ oz. av.
4 "	Cinnamon	1½ oz. "
4 "	Cloves	1½ oz. "
2 "	Nutmeg	278 grains
to make 100 "	Diluted Alcohol	to make 32 fl. oz.

Mix the rhubarb, cinnamon, and nutmeg, and reduce the mixture to a moderately coarse (No. 40) powder; moisten the powder with *fifteen parts* [4 fl. oz.] of diluted alcohol, and macerate for twenty-four hours; then pack it firmly in a cylindrical percolator, and gradually pour diluted alcohol upon it until *one hundred parts* [32 fl. oz.] of tincture are obtained.

Such an arrangement would be very convenient, if it were possible to give exact equivalents of both systems. In a number of cases this may be done, but in many others it is impossible to do so in simple proportions. We refer our correspondent to an editorial in this number.

No. 2,417.—Chewing Gum (A. Sch.).

We have an inquiry from a European correspondent which shows that the fame of tutti-frutti and of other admired brands of chewing gum has not yet penetrated into the innermost recesses of the Continent of Europe, whence it may be inferred that there is still a large territory for the "put-a-nickel-in-the-slot machine" to conquer. For the information of our unsophisticated European friend we will state that "chewing gum" originally was simply any native balsamic exudation derived from various American trees (usually the spruce), often collected by the "chewers" themselves, but also collected for sale. The habit of chewing gum, originally confined to backwoodsman, gradually spread, and was distinctly fostered by the enterprise of dealers and manufacturers, who hit upon the idea to make certain artificial mixtures, suitably flavored (with sassafras, wintergreen, lemon, etc.), which would take the place of the rather "wild" tasting native gums, or rather gum resins. The main object of "gum chewing" is, no doubt, the consolation (!) derived by the chewer from being able to accompany his, or generally her, thought—if there be any—by some exercise or motion.

The composition of modern chewing gum is usually paraffin, with some balata (gum chicle), exhausted balsam of tolu, and similar ingredients. When such a gum lozenge is chewed, it becomes soft, pliable, plastic, may be rolled and squeezed about by the tongue, and appears to afford to the chewer—to judge from his appearance—the most lively satisfaction.

Our friend should, however, understand that the habit of chewing gum is not considered a sign of good breeding, but is mostly confined to the less refined portion of the community.

No. 2,418.—Cologne ("Photo").

In the formula given in our reply to query 2,191 (in our July number for 1889), the quantity of deodorized alcohol to be used is given as "000", which should be 3,000, the "3" having evidently broken off. We will repeat the formula here in full:

Oil of Bergamot.....	80 Gm.
" " Lemon.....	30 "
" " Ylang.....	80 "
" " Neroli, bigar.....	20 "
" " Rose Geranium.....	3 "
" " Rose.....	4 drops
Tinct. of Musk.....	50 Gm.
" " Tolu.....	12 "
Acetic Ether.....	15 "
Orris Root.....	120 "
Deodorized Alcohol.....	3,000 "

Macerate for at least forty-eight hours in a warm room, the bottle being secured against loss by evaporation. Then add:

Fresh Cow's Milk.....	300 Gm.
Deodorized Alcohol.....	500 "
Tinct. of Benzoin.....	50 "
Tinct. of Musk.....	20 "

Mix thoroughly by agitation, and set the mixture aside, well corked, in a cool place for a few days. (It is preferable to set it aside for some weeks, if time can be spared, since the alcohol gradually causes a deposition of crystals of sugar of milk on the sides of the container if the liquid is filtered too soon.) Finally filter, and to the filtrate add:

Oil of Patchouli.....	0.5 to 1 Gm.
Deodorized Alcohol.....	20 Gm.

The patchouli must be regulated according to individual liking.

Particular care should be taken that only the very best oil of rose geranium, free from any terebinthinate or other foreign flavor, be used, as otherwise it would certainly spoil the product. If it cannot be had of good quality, it had better be left out.

We are personally acquainted with the product, and deem it very fine. It may be varied by slight changes in the quantities of the ingredients.

No. 2,419.—Fluid Extract of Roasted Coffee (Harrisburg).

You will find a formula for this preparation in the National Formulary under No. 141. At the meeting of the Missouri Pharm. Assoc. of last year, Mr. G. H. Chas. Klie proposed another process without using alcohol, which he described in the following words:

I decided to prepare a fluid extract without alcohol. I proceeded as follows: I took 2 pounds avoirdupois of roasted coffee—about No. 30 powder—and moistened it thoroughly with 14 fluidounces of boiling water containing 25 per cent of glycerin. The moistened powder was packed moderately tight into a percolator—glass or earthenware percolators are best—and the same menstruum, boiling water containing 25 per cent of glycerin, was used for exhaustion. Look out for your glass percolator when you use this menstruum. However, if the glass is of good quality and has become evenly warm from contact with the hot moistened powder, no break need occur. With a metal percolator no extra care is necessary. The very best percolator for this process is one with a jacket, in which the menstruum can be kept hot during the whole operation. But this is not indispensable. The first 28 volume ounces [meaning a volume equal to 28 avoirdupois ounces of water] of percolate are placed aside as finished extract, and percolation is continued until three percolates, each 2 volume pounds [a volume equal to 2 pounds avoirdupois of water], numbered respectively 1, 2, and 3, are obtained, when the coffee should be practically exhausted. These three percolates are used successively for the next two pounds of coffee, and so on indefinitely or until you stop making the fluid extract. To prevent the reserve percolates 1, 2, and 3 from spoiling, I evaporate until only the glycerin containing the extractive matter is left. This is used in the next process in the same proportion as when pure glycerin is used.

Wishing to ascertain whether the ground coffee left in the percolator was really exhausted by the treatment as described, percolation was carried on after Nos. 1, 2, and 3 had been obtained, until one-half gallon more of percolate had been secured. This was concentrated, precipitated with subacetate of lead, the lead precipitated by sulphuretted hydrogen, filtered, the filtrate rendered slightly acid and shaken with chloroform. The chloroform solution, upon evaporation, left a residue weighing one-half grain, showing that exhaustion was almost perfect.

At the close of his paper the author says:

I have used fluid extract of coffee at the table for quite a time, and must say I am much pleased with it. I am never annoyed by coffee grounds, nor does it ever exhibit the bluish-gray color characteristic of coffee which has been in contact with metal a certain time, and to which milk is then added.

No. 2,420.—Keratinizing Pills (F. T. D.).

This correspondent says that he has had occasion to coat some naphthalin pills with keratin, but has been unable to find a method for doing so.

We are not quite sure whether Mr. D. means to say that he has met with some peculiar difficulty in applying the keratin coat to naphthalin pills, or whether the keratin itself and the general method of coating pills with it are unknown to him.

As we are inclined to infer the latter, and as there is not likely to be any special wrinkle to be observed in the case of naphthalin pills, we will first refer him to articles on keratinizing pills which have appeared in this journal: viz. particularly our volume for 1888, page 149; 1889, 154, and next give an abstract on the subject from Merck's *Bulletin* (January, 1890) and from Fischer's "Neuere Arzneimittel."

Keratin is the natural horny substance of the epidermis, nails, claws, hoofs, hair, feathers, horns, quills, etc. For pharmaceutical purposes, keratin is usually obtained from the quills of geese or other domestic fowl, as it is obtained from this source in a much purer condition. Purified keratin is soluble in acetic acid, in water of ammonia, and in alkaline liquids generally. It is insoluble in hydrochloric acid, and not affected by pepsin. Some price lists quote "pepsinized keratin." This is intended to mean keratin from which any matter digestible by pepsin has been extracted.

Pure keratin, therefore, is entirely insoluble in the gastric fluid, and, therefore, any pill, bolus, etc., coated with it will remain undissolved in the stomach and be carried whole into the intestine. The intestinal fluids, however, are alkaline, and it is here that the coating of the pill, bolus, etc., is dissolved, exposing the medicament and allowing it to exert its proper action.

It matters not what medicaments are used in the pills, provided they be worked up and maintained *sufficiently dry* to keep their contents from mingling with or injuring the keratin coating.

The pills, therefore, must not only *not* contain any appreciable moisture, but also no hygroscopic substances, such as most vegetable excipients; for evaporation in the former case might cause the pills to shrink, and absorption of moisture in the latter might make them swell, thus

in either case destroying the continuity of the keratin coating.

The body of the pill mass may consist of a mixture of

Yellow Wax 1 part,
Talcum, or
Butter of Cacao 10 parts,

melted together.

If dry diluents are wanted, kaolin, bole, or powdered charcoal may be used.

The pills, when made from a mass prepared on the above principle and properly medicated, are best immersed (according to Dr. B. Fischer) in melted butter of cacao for a moment and then rolled in powdered graphite to smooth them. Next they are coated with keratin by rolling them in a solution of it until the solution is evaporated, repeating the process (perhaps as many as ten to twelve times) until the coating is thick enough.

The sufficiency of the coating may be determined by making at the same time a few trial pills of calcium sulphide, a little larger than the rest so as to be able to recognize them. When it is assumed that all the pills are sufficiently coated, one of these sulphide-of-calcium pills is taken. If no eructation of hydrosulphuric acid gas is experienced within a few hours thereafter, it may be safely assumed that the coating is sufficient.

In preparing the pill mass, fatty medicaments may be combined with wax or with a cerate. Aqueous extracts may be thickened with powdered acacia or tragacanth, and further with a non-hygroscopic vegetable or mineral powder. A cerate may then still be added, unless incompatible.

There are two kinds of solutions of keratin used :

1. Ammoniacal Solution.

Keratin 7 parts.
Water of Ammonia 50 "
Alcohol (60 per cent) 50 "

Dissolve by gently heating.

2. Acetated Solution.

Keratin 7 parts.
Glacial Acetic Acid 100 "

Dissolve by gently heating.

The ammoniacal solution is preferable for pills containing pancreatin, trypsin, bile, sulphide of iron, etc., that is, for any substance which would be liable to be injured or decomposed by acids.

The acetated solution, on the other hand, is preferable for such substances as are incompatible with an alkali, such as salts of silver, gold, and mercury, chloride of iron, creosote, salicylic acid, etc.

In the case of chemically neutral substances—such, for instance, as naphthalin—either solution may be used.

The *keratinized pill* (or "*Ileac Pill*") is regarded by Dr. Unna an eligible vehicle for the administration of medicines which (1) are apt to irritate the mucous membrane of the stomach when administered for a long time; (2) impair the digestive process (f. i., lead acetate, corrosive sublimate, etc.); (3) are rendered inert or are decomposed by the gastric juice; (4) are specially intended to reach the intestine without change; and (5) are intended to exercise an indirect effect—not local—on gastric complaints (for instance, arsenic in dyspeptic anemia, cardialgia).

No. 2,421.—Percentage Solutions ("Young Drug Clerk").

This correspondent says: "Please inform me what proportion of a drug is to be used, as a rule, when it is ordered in solution by percentage; for instance, solution of cocaine, 10%, 15%, 20%, etc., such as is often prescribed by physicians. The U. S. P. and the Dispensatory give no light on this subject."

We would say, first, that the Pharmacopœia is not the place where information regarding this matter can be expected. This is a simple affair of arithmetic. When we speak of a 10-per-cent solution, for instance, it is understood that we mean one containing, *by weight*, 10 parts of a certain substance in 100 parts of the finished solution. For instance, on dissolving 10 grains of hydrochlorate of cocaine in 90 grains of water, we obtain 100 grains of a solution which, of course, contains 10 per cent of the salt. Our experience has shown us that, though this is so simple and plain, yet beginners are often puzzled when they receive an order to make, for instance, 2 fluidounces or any other definite volume of a solution of a given percentage. For instance:

B Sol. Cocainæ Hydrochlor. (4 per cent) . . . fl. oz. 4.

If it were required to prepare in *one* operation an *absolutely exact measure* (as determined, for instance, at 60° F.) of 4 fluidounces of the solution containing 4 per cent of hydrochlorate of cocaine, we acknowledge that the calculation would become somewhat difficult, as it would involve a previous knowledge of the specific gravity of a solution of the required percentage. But this is not the problem in practice. The real task is to prepare a *convenient quantity* of a true 4-per-cent solution—if practicable, a little over 4 fluidounces by measure—and then to dispense from this the quantity prescribed.

We would proceed as follows: A fluidounce of water at the ordinary temperature weighs, practically, 456 grains. Four fluidounces, therefore, weigh 1,824 grains. Assum-

ing this to be, not plain water, but a 4-per-cent solution of the cocaine salt, it would contain 72.9, or practically 73 grains of it. Hence, to make 1,824 grains of the solution of cocaine (assuming, for the moment, that this would have the same specific gravity as water), we would have to take:

Cocaine Hydrochlorate 73 grains.
Water 1,751 "

Total 1,824 "

In reality, this amount of the solution will not measure quite 4 fluidounces, but will be so near it that it is practically equal to that volume.

If there is a necessity to dispense not less than 4 fluidounces, the above given quantities need only be relatively increased, for instance to:

Cocaine Hydrochlorate 80 grains.
Water 1,920 "

2,000 "

and of this solution, which measures over 4 fluidounces, the required volume dispensed. A method for obtaining the exact volume required will be given presently.

The more concentrated a solution is, and the heavier the solid dissolved therein is, the greater will be the weight of equal volumes of such solutions. If all solutions of equal percentage of dissolved substance occupied the same volume, it would be an easy matter to determine, once for all, the exact quantity of substance to be weighed out for preparing a solution of any desired volume. But this is not the case. With some substances a 20-per-cent solution, for instance, will occupy but little more bulk than the volume of the pure solvent itself; with other substances, however, the solution may occupy nearly twice the volume. This being well known, experienced dispensers, who often have certain percentage solutions to dispense, prepare for their use a table of proportions of substance and solvent required to obtain a definite amount of solution.

The calculation of these proportions is a comparatively simple matter. The best practical method is the following, in which it is supposed that it is required to find out the quantities, by weight, necessary to prepare *one pint* of a 50-per-cent solution of iodide of potassium, without consuming more iodide than is absolutely necessary—that is, without having any of the solution left over. This may be done in two steps:

1. First prepare such an amount of a 50-per-cent solution as will surely be less than the full volume (1 pint) required.

2. Having measured this exactly, calculate how much of the salt will be wanted for the remainder of the volume.

Supposing the operator first dissolves 4 troy ounces of iodide of potassium in enough water to make 8 troy ounces—which will, of course, produce a 50-per-cent solution. He will then measure the latter carefully, as near to 60° F. as possible, and he will find that it measures, practically, 5 fluidounces and 270 minims (or 2,670 minims). A pint, however, has 7,680 minims. He has, therefore, still to prepare 5,010 minims of the same kind (viz., 50 per cent) solution as had already been prepared. The amount of iodide of potassium required for this is found by a simple equation:

As 2,670 minims of a 50-per-cent solution is to 4 troy ounces, or 1,920 grains of iodide of potassium contained therein, so is 5,010 minims of a like solution to the amount of iodide required for this:

$$\frac{2,670 : 1,920 = 5,010 : x}{x = 3,608}$$

or, practically, 3,600 grains.

The operator will therefore add to the solution already prepared 3,600 grains of iodide of potassium, and gradually enough water to make the finished solution, measured at or near 60° F., amount to *one pint*.

He will then make a note that to make a pint of a 50-per-cent solution of iodide of potassium there are required (1,920 + 3,600 =) 5,520 grains of the salt.

Information Wanted.

1. A. E. P. & Co. want to know what "Household Ammonia" is, or what might be dispensed when this is called for.

2. J. B. wants to know whether there is any one in this country who makes reliable thermostats constructed to maintain fixed temperatures between 200° and 225° F.

Purgative Chocolate.—M. Giraud proposes a preparation made as follows:

Cacao (powdered and freed from oil) 50 Gm.
Sugar (powdered) 100 "
Castor Oil 50 "
Vanilla (powdered) q. s.

Make into tablets.

The oil should be incorporated with the cacao, and the sugar and vanilla added. The ingredients must be well worked up on a heated slab, and allowed to cool in moulds.—*Chem. and Drugg.*

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[ORIGINAL COMMUNICATION.]

CRITICAL NOTES ON THE U. S. PHARMACOPŒIA.*

BY WILLIAM WEBER, PITTSBURGH, PA.

Adeps Benzoinatus.—Hell ("Pharmaceut. Manuale," third edition) says: To prevent rancidity, it seems necessary to choose the proportion of 5 parts of benzoin to 100 parts of lard. Dieterich ("Pharmaceut. Manuale," second edition) gives this formula: 100 parts of lard freshly rendered, 10 parts each of Sumatra benzoin coarsely powdered and of finely powdered efflorescent sodium sulphate. The whole, having been previously mixed, is heated on a steam-bath for one hour, stirring constantly, strained, and finally filtered. The sodium sulphate serves a double purpose, viz., to free the lard from water and to prevent the conglomeration of benzoin. Finally benzoinated lard, according to Utescher (*Apoth. Zeit.*) prepared by digestion with benzoin, contains only the acid of the gum resin. It may be prepared, therefore, from the acid, sublimed from benzoin—one per cent—in a more simple manner, thereby furnishing an ointment of better color and consistency than by the old method, and of equal keeping qualities. But somewhere I found the remark that benzoinated lard made in this way is too irritating. I also doubt if Rother's view about the greater antizymotic power of balsam of tolu is correct. Dieterich (l. c.) gives a formula for making an antiseptic lard with balsam of tolu in the proportion of 1:10, but says that it does not keep as well as benzoinated lard.

Amylum Iodatum.—Dieterich (l. c.) gives his process: He first dissolves the iodine in ether, mixes this with the starch, dries at ordinary temperature, and preserves in well-closed vessels. He prefers the ether for two reasons: first, to shorten the time of drying; secondly, to reduce to a minimum the evaporation of iodine.

Aque Medicatæ.—If the process is changed, it would also be well to give processes for making them by distillation, for the benefit of those who have the facilities and who use large quantities of any one kind, because it cannot be denied that distilled waters are the best. Formulæ should also be given for making small quantities when wanted. Dieterich (l. c.) gives formulæ for such from solutions of the oils in alcohol, made in the proportion of 1:10, and uses 1 drop for 10 Gm. of water. Perhaps here the official spirits could be used, or, if the official process was changed to the hot-water process, we could instantaneously make up the smallest quantities, supposing—as it should be—that in a well-regulated pharmacy hot water is always at hand.

Language in Official Directions of Aqua Anisi, Cinna-momi, etc.—It is not clear from the wording what we should pack in a conical percolator, whether the oil or the cotton; the language is correct in Aqua Camphoræ.

Aqua Amygdalæ Amara.—The amount of hydrocyanic acid should by all means be adjusted to a fixed limit.

Aqua Aurantii Florum.—Hell (l. c.) says: For distillation the proportion of one part of drug to ten parts of product would be better, being sufficiently strong. An extempore formula for preparing this water from the essential oil might be given, though some authors say that the product is not equal to the distilled water.

Aqua Camphoræ.—Dieterich's process is as follows: 0.2 Gm. of camphor, 100 Gm. of hot water; dissolve by shaking, and filter. He points out that water cannot take up more camphor.

Aqua Chlori.—Should only be made extempore.

Aqua Rosæ.—The remarks made under Aqua Aurantii Florum respecting an extempore formula (from the oil) apply also here.

Argenti Nitras Dilutus.—Dieterich's formula coincides with that of Dr. Squibb, but in addition he uses talcum for moulds.

Arnica Radix.—In Germany this title is dismissed; here it was introduced in 1880. As its composition is nearly identical with that of the flowers, its introduction was hardly warranted, unless it was for the reason that, being less bulky, it is easier to handle in making pharmaceutical preparations, a statement we find in "Oldberg and Wall."

Ceratum Cantharidis.—Should be given up for Ceratum Extracti Cantharidis.

Ceratum Plumbi Subacetatis.—See formula by Eggenfels (in the U. S. Dispensatory). To prevent yellow color, use a trace of acetic acid (Remington).

Chinoidinum.—Quinine is so cheap to-day that we can well do without chinoidine.

Cinchonina; Cinchonina Sulphas.—Do not seem to be used any longer. Perhaps superfluous.

Collodium cum Cantharide.—Dieterich gives a formula for the same with Cantharidin: 0.15 Gm. Cantharidin, 4.0 Gm. Rapeseed Oil, 96 Gm. Collodion.

Decoctum Cetrariæ.—To remove the bitter principle, it is better to use an alkaline menstruum (Remington).

Elaterinum.—This substance was introduced to avoid the dangers connected with elaterium. But, from statements found in the literature, even elaterin appears to vary; sometimes it may be a very powerful substance, again it may be wholly inert, as has been demonstrated by Hiller. Therefore Böhm recommends to begin with one one-hundred-and-twentieth grain, and to increase slowly the dose from one-sixtieth to one-twentieth grain.*

Elixir Aurantii.—If the hot-water process should be selected for the medicated waters, this elixir could easily be made by first dissolving the oil in the water, then adding the alcohol, finally the syrup, and filtering.

Emplastrum Ammoniaci cum Hydrargyro.—If we want the specific properties of mercury, we would prefer the mercury plaster, pure and simple.

Extracta solida, sicca, fluida.—At present, with our advances in science, they do not fill a want as when they were first introduced. Sooner or later they will have to give way to the sole employment of alkaloids and allied bodies. One question arises at present: What will be done with the solid extracts? Will they be retained or replaced by abstracts or powdered extracts as far as practicable? The defects of solid extracts are so well known that we need not add anything further. Hell says (l. c.): "Regarding the consistence of extracts, it has nowhere been possible to break with old habits, etc. Inspissated extracts are truly called an antiquated medication. A more impracticable form for these preparations, subjected to deterioration and desiccation, can hardly exist. To the practitioner it must appear as the most judicious thing if we had only two consistences of extracts, viz., the liquid and the dry form. Only these two forms appear worth while to be recognized in future pharmacopœias. The solid extracts, then, should be dismissed and replaced by powdered extracts (or abstracts) as far as practicable. The present Pharmacopœia has only two powdered extracts, viz., Extractum Colocynthis and Extractum Colocynthis Compositum."

Extractum Cannabis Indicæ.—Hell (l. c.) says: To extract the resin fully, and to give the extract a more striking green color, an addition of 10-15 per cent of ether to the alcohol is of great advantage.

Extractum Cubebæ Fluidum.—Menstruum should be alcohol and ether (Hell).

Extractum Phytostigmatis.—Böhm says: Unsuitable for an extract. Binz: The alkaloid spoils rapidly.

Guarana.—Do we need it any longer, since its physiological action depends on caffeine, of which it contains as much as 5 per cent? And, by the way, a dose of guarana costs considerably more than an equivalent dose of caffeine.

Hydrargyrum cum Creta.—Remington ("Practice of Pharmacy") says: It should be free from mercurous or mercuric oxide; through exposure to air, old specimens frequently contain both. Also Hager ("Pharmaceut. Praxis") points out, in strong words, these same dangers. Therefore we should dismiss it. Its action is the same as that of calomel.

Infusa.—The official time—two hours—is too long; in some cases we cannot afford to let our customers wait so long. The German Pharmacopœia directs five minutes. Half an hour would be ample.

Infusum Digitalis.—The infusion does not fully represent the drug. It contains principally digitalein and some digitalin, but no digitoxin, and for this reason several authors prefer digitalis in substance (Binz, Penzoldt); others, again, are in favor of the infusion as long as we cannot use any of the active principles; while, finally, Binz lays particular stress on the point that heat injures those principles which are soluble in water. Regarding the process, it strikes me that the cinnamon should be left out, or afterwards added in the form of spirit, for the simple reason that the cinnamon obstructs the view.

Linimentum Cantharidis.—Should be dismissed, as it

* The above notes do not comprise the entire paper of the author. Certain portions of it, which are of more direct interest to the Committee of Revision than to the general reader, have been omitted, with the consent of the author. —Ed.

* We believe that the inertness of some specimens of elaterin experimented with by a few observers is not due to a variable intrinsic power, but to the accidental or intentional admixture of impurities. We have had much experience with elaterin, and have had no difficulty in getting a pure article, or in obtaining satisfactory results in the usual doses, viz., Tritur. Elaterini (10%) $\frac{1}{4}$ to $\frac{1}{2}$ grain.—Ed. Am. Drugg.

may blister if not cautiously applied. The Nat. Dispensatory is also strongly against it for the same reason.

Linimentum Plumbi Subacetatis.—Should be freshly made (Dieterich).

Linimentum Saponis.—My formula would be to first dissolve the camphor and the oil in the alcohol, then to add the soap and water, digest at a moderate heat until dissolved, filter, and bring up with water to the required quantity.

Liquor Acidi Arseniosi.—The Nat. Dispensatory is against the same; still it may be serviceable in combination with alkaloidal solutions where Fowler's solution would be objectionable.

Liquor Calcis.—Hell (l. c.) considers the pouring-off of the first quantity of water as extremely superfluous.

Mel Rosæ.—Not absolutely necessary. Hell (l. c.) proposes as a quick process to add 2 drops of oil of rose, triturated with a little sugar, to 1 pound of clarified honey.

Mistura Ferri Composita.—The official directions should be remodelled. As they stand, it is hardly practicable to carry them out to the letter.

Oleum Amygdalæ Amaræ.—Should be dismissed or standardized as to hydrocyanic acid; if not, it is dangerous for internal administration.

Pilulæ.—Should be left to individual prescribing and to the "lex artis" of the pharmacist. We could easily dismiss, without curtailing the physician in the least, the following: *Pilulæ Aloes*, *P. Aloes et Asafoetidæ*, *P. Aloes et Mastiches*, *P. Aloes et Myrrhæ*, *P. Antimonii Compositæ*, *P. Asafoetidæ*, *P. Galbani Compositæ*; and perhaps also *Pilulæ Aloes et Ferri*, regarding which I find somewhere the statement: "Frequently ill-borne by the stomach."

Scammonium.—Should be dismissed for two reasons: First, it contains very variable quantities of resin, and its action is therefore not reliable; secondly, its active principle, "jalapin," is nearly identical, chemically and physically, with convolvulin (from jalap).

Spiritus Menthæ Piperitæ.—Why not macerate independently the peppermint with a small quantity of alcohol, for instance, in a graduate, throw this, after twenty-four hours, with the solution of the oil in alcohol, upon the filter, and thus save the annoyance of adhering particles to the sides of the bottle? The same way of procedure might also be followed in the cases of *Spiritus Limonis* and *Spir. Menthæ Viridis*.

Strychnina.—Requires 6,667 parts of cold water for solution. Might well be dispensed with.

Syrupi.—The different pharmacopœias use different proportions; a sufficient quantity of sugar is necessary for preservation. Hell holds that the proportion of 65 : 35 or 18 : 10 is the best, and he strongly condemns the proportion 60 : 40 or 15 : 10. The correct proportion we find in the following syrups of the U. S. P.: *Syrupus*, *Syrupus Aurantii Florum*, *S. Tolutanus*, *S. Zingiberis*; 60 per cent we find in *Syrupus Acidi Hydriodici*, *S. Allii*, *S. Althææ*, *S. Aurantii*, *S. Calcii Lactophosphatis*, *S. Ferri Bromidi*, *S. Ferri Iodidi*, *S. Ferri Quininae et Strychninae Phosphatum*, *S. Limonis*, *S. Picis Liquidæ*, *S. Pruni Virginianæ*, *S. Rhei*, *S. Rubi Idæi*, *S. Sarsaparillæ Compositus*, *S. Scillæ*, *S. Scillæ Compositus*, *S. Senegæ*, *S. Sennæ*; 50 per cent in *Syrupus Amygdalæ*, *S. Hypophosphitum*, *S. Hypophosphitum cum Ferro*; 30 per cent only in *Syrupus Calcis*, and naturally the percentage of sugar is reduced in those syrups which are simply made by admixture—as, for instance, *Syrupus Ipecacuanhæ*, *S. Krameria*, *S. Rhei Aromaticus*; also somewhat in *Syrupus Acidi Citrici*, etc.

Straining of Syrups.—Straining or filtering of syrups is generally prescribed, but in a few instances, for no obvious reasons, omitted—viz.: in the case of *Syrupus Allii*, *S. Althææ*, *S. Aurantium Florum*, *S. Picis Liquidæ*. Adding sugar to a filtered liquid will nevertheless necessitate filtering or straining, because there are always impurities present in the sugar.

Syrupus Acidi Citrici.—What advantage is it to add the citric acid, dissolved in the water, "gradually"?

Syrupus Althææ.—A process should be devised so that we can keep at least some on hand.

Syrupus Aurantii.—Behringer states (see "Digest") that after expression only 1 to 1½ parts of filtrate are obtained instead of 5 parts. Therefore it seems to me that in a case of this kind (where maceration is practised) we should know how much moisture the drug will absorb and finally retain, and then add this inevitable loss at once to the menstruum, so that after filtration or expression we just have the required quantity without being compelled to add more of the menstruum which has never been in contact with the drug. Hence the above filtrate of 1½ parts + 3½ parts of alcohol must be inferior to one where the original amount of menstruum has been large enough to just produce, after expression, 5 parts of filtrate.

Syrupus Pruni Virginianæ.—In the "Digest" we find the remark taken from the U. S. Dispensatory: "15–20 per cent of glycerin answers the purpose better than 5 per cent." I do not use any glycerin at all, and yet my

syrup keeps remarkably well. The glycerin craze is a nuisance; instead of being on the wane, it appears to be on the increase. Under *Syrupus Rhei Aromaticus* it is even claimed that replacing half the syrup with glycerin would be an improvement. The originators of such formulæ seemingly forget that glycerin is not an indifferent substance. Is a syrup with half its weight of glycerin still a syrup? I make *Syrupus Rhei Aromaticus* with a tincture made by myself, and not with a fluid extract made by some one else, and it is perfectly transparent. Finally, I would like to see better and shorter formulæ adopted for the following syrups: *Syrupus Rhei*, *S. Sarsaparillæ Comp.*, *S. Scillæ*, *S. Scillæ Comp.*, *S. Sennæ*, *S. Tolutanus*, *S. Zingiberis*.

Tincturæ.—The U. S. Ph. of 1870 contained 46 fluid extracts; at the revision in 1880, 2 were dismissed—viz., *Extractum Erigerontis Fluidum* and *Ext. Spigeliæ et Sennæ Fluidum*—and 35 were added, making a total of 79 official fluid extracts at the present time. The tinctures of the old Pharmacopœia numbered 57; 7 of these were dismissed and 22 new ones added, making a total of 72 tinctures, not counting *Tincturæ Herbarum Recentium*. Notwithstanding this apparent increase, the following comparison will show that tinctures are gradually losing ground. As is well known, tinctures are much older preparations than fluid extracts, but we find—in accord with the times—very seldom to-day a tincture introduced with a new fluid extract. Of the 35 new fluid extracts there are only 2 which have corresponding tinctures, viz.: *Tinctura Arnicae Radicis* and *Tinctura Chiratae*. Four tinctures, corresponding to fluid extracts previously official, were added, viz.: *Tinctura Cimicifugæ*, *Gelsemii*, *Hydrastis*, *Matico*—an addition hardly warranted. The balance of newly added tinctures—16—have no corresponding fluid extracts in the Pharmacopœia. In two cases this would be impossible, namely, *Tinctura Ferri Acetatis* and *Tinctura Saponis Viridis*. In other cases again we might ask, Why was not a fluid extract introduced alongside of the tincture—f. i., *Tinctura Bryoniae*, *T. Physostigmatis*, etc.? Of previously official tinctures 32 have no corresponding fluid extracts (in some cases this would be impossible), viz.: *Tinctura Aloes*, *Aloes et Myrrhæ*, *Arnicae Florum*, *Asafoetida*, *Aurantii Dulcis*, *Belladonnae*, *Benzoini*, *Benzoini Composita*, *Cantharidis*, *Cardamomi*, *Cardamomi Composita*, *Catechu Composita*, *Cinchonæ Composita*, *Cinnamomi*, *Ferri Chloridi*, *Gallicæ*, *Gentianæ Composita*, *Guaiaci*, *Guaiaci Ammoniata*, *Humuli*, *Iodi*, *Kino*, *Lavandulæ Composita*, *Moschi*, *Myrrhæ*, *Opii*, *Opii Camphorata*, *Opii Deodorata*, *Rhei*, *Tolutana*, *Valerianæ Ammoniata*, *Vanillæ*. On the whole there are 79 fluid extracts with 28 corresponding tinctures. Some or most of the latter could be dispensed with. Where the dose of the fluid extract is safe and large enough to be easily divided, we should give preference to the fluid extract and dismiss the corresponding tincture. As a dose which can be easily and accurately divided, we would take a fluid extract with a dose of from 15 m for an adult; but to follow this plan would exclude quite a number of fluid extracts, and we find that we have to go as low as 5 m. But where the dose of the fluid extract is only 1 to 2 m for an adult, we would prefer to retain a corresponding tincture. Thus, comparing the doses of these 28 tinctures with the respective fluid extracts, we find that, as far as the doses are concerned, we can dispense with tinctures in the case of the drugs of which we have the following official fluid extracts: [See table on opposite page.]

We have only left the following tinctures, viz.: *Tinctura Aconiti*, *Cannabis Indicae*, *Capsici*, *Digitalis*, *Stramonii*, *Veratri Viridis*. The doses of their fluid extracts are:

		Nat. Disp.	U. S. Disp.
Extractum Aconiti	Fl.	½–1 m (to begin with)	same.
" Cannabis Indicae	"	½–1 m	same.
" Capsici	"	1–2 m	½–1 m
" Digitalis	"	1–2 gtt.	1–2 m
" Stramonii	"	1–2 m (to begin with)	1–2 m
" Veratri Viridis	"	1–3 m	1–2 m

It would, however, be advisable to retain for domestic trade a few of these tinctures, viz.: *Tinctura Cinchonæ*, *Cubebæ* (?), *Lobeliæ* (?), *Valerianæ*, *Zingiberis*.

[The author further adduces special reasons, based on therapeutic or other grounds, for dismissing or retaining particular tinctures; these are here omitted.]

Tinctura Aloes.—The U. S. Dispensatory speaks of its external uses. Böhm is partly in its favor as a stomachic; against the same, Binz, Penzoldt. Process: Should be made extempore by simply triturating the aloes and glycyrrhiza with the required amount of alcohol and water.

Tinctura Aloes et Myrrhæ.—Not needed. Process: Could be quickly made in the same manner as the preceding tincture.

Tinctura Benzoini.—Process: Rub the benzoin with the alcohol, and filter.

Tinctura Cinchonæ Composita.—Formula: Why not

leave out the *Serpentaria*? I would prefer the German formula with cinchona, orange peel, gentian, and cinnamon.

Tinctura Croci.—For coloring purposes something more tasteless ought to be substituted.

Tinctura Digitalis.—Does the tincture contain digitalin?

Tinctura Gallæ.—It would be advisable to introduce a tincture or solution of tannic acid instead.

Tinctura Lavandulæ Composita.—Called by some authors an agreeable adjuvant, a fact which I would not confirm. Either the oil should be omitted and the tincture be called *Tinct. Cinnamomi Comp.* or *Tinctura Cardamomi Comp.*, or *Tinctura Cinnamomi* be used instead.

Tinctura Myrrhæ.—Process: Could be made in the same manner as *Tinctura Aloes*.

Tinctura Opii Camphorata.—It may be of interest to cite Schmiedeberg's sentence: "Superfluous, irrational preparation. This tincture is a curiosity." Called also superfluous by Penzoldt. Still it may be advantageous to possess a tincture of opium with camphor, and thus a great deal of damage which would be done is averted. No doubt the benzoic acid figures here for the sake of a stimulant expectorant, but Binz says: "The small quantity of benzoic acid probably plays no part in the usual doses." If we wanted, then, to combine expectorant properties with paregoric, the amount of benzoic acid must be considerably increased. Process: Should the camphor be dissolved first or some be left after maceration?

majority of ointments petrolatum instead of lard or benzoated lard. But petrolatum has its drawbacks, and so has lanolin, which some people wish to use exclusively. The best solution out of the dilemma might be, if the Pharmacopœia would allow several ointment bases for the several emergencies or the different seasons.

Unguentum Acidi Carbolici.—Should be left to individual prescribing.

Vina.—The Pharmacopœia enumerates several wines from drugs of which we also have a fluid extract or tincture made with a different (stronger and more appropriate) menstruum. Can the resulting products, therefore, contain all of the active substances which we find in the corresponding fluid extracts or tinctures? It appears not. It seems, therefore, that even in the doses due allowance is made for this fact, even if done unconsciously. This is most strikingly shown in the case of *Vinum Aloes*. *Vinum aloes* (6 per cent aloes), dose one-half fl. oz.; *Tinctura Aloes* (10 per cent aloes), laxative, dose 15-45 m; purgative, 1½ fl. 3. Medicinal wines, even if they are inferior in medicinal qualities, may have one advantage, and that is better taste, but still we may well get along without most of them.

I now wish to point out those substances where, instead or besides the present preparations or forms, we could introduce one or more active principles, as the times are nearly ripe for mathematical medication. These latter substances have one great drawback—they are generally high-priced; but as most of them are only used in small doses, their cost after all is only a trifle, but still enough of these are left which for general practice are too dear.

			Doses taken from:	
			Nat. Dispensatory.	U. S. Dispensatory.
Extractum	Arnice Rad.	Fluidum....	10-30 m	5-10 m
"	Aurantii Amari	"	1 3	15-30 m
"	Calumbæ	"	no dose	15-30 m
"	Chiratae	"	ab. 20 m	30 m
"	Cimicifugæ	"	30 m-1 3	30 m-1 3
"	Cinchonæ	"	as a tonic ½ 3	1 3 (apparently).
"	Colchici Sem.	"	2-8 m	2-8 m
"	Conii	"	2-6 m	5 m (to begin with).
"	Cubebæ	"	10-30 m	10-40 m
"	Gelsemii	"	5-10 m	2-8 m
"	Hydrastis	"	1 3	1-2 3
"	Hyoscyami	"	5-10 m	5 m (to commence with).
"	Kramerizæ	"	½ 3	10 m-1 3
"	Lobeliæ	"	{ Emetic 10-20 m	same.
"	Matico	"	{ Expect. 1-5 m	½-1 3
"	Nucis Vomice	"	½-2 3	3-5 m
"	Quassia	"	1-5 m or more	5-10 m
"	Sanguinaria	"	5-20 m	3-5 m
"	Scillæ	"	{ Emetic 10-60 m	2-3 m (as an expectorant).
"	Serpentariæ	"	{ Nauseant 3-5 m	20-30 m
"	Valerianæ	"	3 m or more	ab. 1 3
"	Zingiberis	"	½ 3	10-20 m
			10 m or more	

Tinctura Rhei Aromatica and *Tinctura Rhei Dulcis*.—The title implies that these tinctures are the same as *Tinct. Rhei*, with the exception that the one is aromatic and the other sweet, but, strictly speaking, *Tinct. Rhei* is already an aromatic tincture through the *Cardamom*. *Tinct. Rhei* contains 12 per cent, *Tinct. Rhei Aromatica* 20 per cent, and *Tinct. Rhei Dulcis* only 8 per cent of rhubarb. Why not make the percentage of rhubarb a uniform 20 per cent? In this instance we would probably have to raise the amount of aromatics, etc., accordingly.

General Remarks on Tinctures.—Finally we query: Would it not be fully appropriate, if we must have tinctures, to make some from their active principles, f. i., *Tinct. Physostigmatis*, *Nucis Vomice*, etc.? The Pharmacopœia Belgica makes the latter from strychnine. We also wish to direct attention to the following irregularities in fineness of powder. The Pharmacopœia directs for

- Tinct. Aloes*, aloes in moderately fine powder.
- Tinct. Benzoini Comp.*, aloes in coarse powder.
- Tinct. Benzoini*, benzoin in moderately coarse powder.
- Tinct. Benzoini Comp.*, benzoin in coarse powder.
- Tinct. Cardamomi*, cardamom in No. 30 powder.
- Tinct. Cardamomi Comp.*, cardamom in No. 40 powder.
- Tinctura Cinchonæ Comp.*, bitter orange peel in No. 60 powder.
- Tinct. Gentianæ Comp.*, bitter orange peel in No. 40 powder.
- Compound tinctures should represent the same proportion of the base as the simple tinctures; but we find in *Tinct. Benzoini* 20 parts of benzoin; *Tinct. Benzoini Comp.*, 12 parts only; *Tinct. Cardamomi*, 15 parts of cardamom; *Tinct. Cardamomi Comp.*, 20 parts of cardamom; *Tinct. Cinchonæ*, 20 parts of yellow cinchona; *Tinct. Cinchonæ Comp.*, 10 parts of red cinchona.

Unguenta.—Regarding ointment bases I wish to say this: Remington recommends to us as a base for the ma-

If the pharmacist's bill is then high, he gets the blame, and is upbraided for his supposed exorbitant and outrageous charges. The drugs referred to are Aloes, Brayera, Cantharis, Colchicum, Colocynthis, Conium, [Creasotum], Dulcamara, Ergota [?], Erythroxylon, Euonymus, Frangula (?), Gelsemium, Gentiana, Granatum, Hydrastis, Iris, Jalapa, Leptandra, Lobelia, Physostigma, Pilocarpus, Podophyllum, Quassia, Sanguinaria, Senna, Scoparius, Uva Ursi. To some of these I have to add a few remarks.

Conium.—It was certainly a great step forward in the right direction to dismiss the leaves and to introduce the fruit. But then the fruit is not exactly what we need. Coniine (or, better, one of its salts, the hydrochlorate or hydrobromate) ably fills the indications for this drug. Bartholow says: "The preparations of conium are very uncertain in strength. It is pretty well established that the extracts are nearly if not quite inert. The best preparations are the fluid extract and the alkaloid." Further on he says: "The chlorhydrate resp. bromhydrate of coniine are greatly to be preferred, not only to the pure alkaloid, but to any of the preparations of conium." Also Hugo Schulz (in Eulenberg's "Encyclopædia") is strongly in favor of the salts of coniine, and it is to be hoped that the next Committee of Revision will adopt at least the hydrobromate of coniine, although the use of conium is greatly restricted in our times. This is owing, according to Hugo Schulz, perhaps most to the inactivity of the customary preparations.

Creasotum.—Guaiacol, its most important constituent (60-90 per cent), which has a definite composition, has been tried and is now used by Sahli, Fraentzel, Schüller, and others, and should be made officinal.

Eucalyptus.—From the literature it appears that the oil could fully and ably take the place of the crude drug and its preparations. Perhaps then it would be well to introduce a solution of oil in alcohol for dispensing purposes,

Physostigma, Pilocarpus.—Should be dismissed. Their principal active substances, physostigmine and pilocarpine, should only be used.

Uva Ursi.—Arbutin is thought by some authors to represent the drug fully.

Finally, I would like to see the following improvements made in the Pharmacopœia: To state or to describe the color of tinctures, fluid extracts [?], perhaps also of other preparations; to state, in every case where a formula is given for a certain substance, the expected or required yield—for instance, in iron preparations and the like—in solid extracts, etc.; to name in the formulæ directing percolation the exact quantity of menstruum necessary for a required quantity of drug (see Dieterich's formulæ for fluid extracts); to give, if possible, a table of drops in each fluidrachm of pharmacopœial liquids, so that, when we get a prescription with a substance only specified in drops instead of minims, we can readily find the equivalent of the drops in minims, and save time and trouble. And, last of all, the Pharmacopœia should give full directions regarding the preservation of its preparations, etc., as far as possible. In quite a number of cases the Pharmacopœia already imparts such knowledge, but it could be widely extended at this date.

THE PERFUME OF ROSES.

At the outset, it is not the *perfume* but the *perfumes* of roses of which we should speak; for a slight examination of even a small collection of rose bushes will show that it is difficult to find two varieties of roses possessed of the same odor. Even in two roses of the same species, one partly open and the other completely opened, one can distinguish different shades of the odors which they furnish. Or, still better, the same rose gives different odors at different times of the day. Thus, in the morning, before the dew is dissipated from the night rose, it does not exhale the same odor as at noontide when its petals wither and its stem droops. There are, if one pleases so to consider it, shades of the same fundamental odor at different times, and it is evident that it may be necessary, at times, to give close attention and possess a cultivated sense of smell to distinguish these differences. Certainly no odor justifies in greater degree the use of the term *subtle*. On the other hand, by the side of roses gifted with a classic perfume, well recognized but with various shades—roses which have the *rose odor*—there are many which exhale quite a different odor. There is one with the odor of the violet (*Banksia alba*); the lily of the valley (*Rosa Ripartii*); musk (*Rose Salet*—a hybrid of the moss rose); mignonette (*Rosa canina*); hyacinth (single yellow rose—variety of filbert rose); carnation (*R. moschata*); raspberry (*Gloire de Dijon*—tea rose); apricot (*R. bracteata*); pineapple (*Rose Desprez*); rennet apple, etc. One has the odor of the bedbug (*Rosa lutea*, *Rosa platyacantha*, *Rosa Beygeriana*). Moreover, there are those which have no smell, and these are numerous and not the least beautiful (Persian yellow, Captain Christy, etc.). Does there exist a relation between these various odors and the specific characters of the flowers? That is to say, does a study of the perfume aid the naturalist in the classification of roses? In some cases it does; in many more it does not.

We will not undertake, at this time, to enter into the details of this question, but refer the reader to "Les produits odorants des Rosiers," by Dr. Blondel; Paris: O. Doin, 1889, pp. 163, 8vo. The determination of the perfume of a rose is, more often than otherwise, not so easy as it may seem. Everybody knows that in a rose the petals evolve the perfume, but what is habitually ignored is that the green portions—the calyx and pedicle of the flower—have frequently their particular odor, which enters into combination with that of the petals in the mixture of perfumes submitted to our sense. It may happen that the petals do not smell at all, and the calyx alone yields all the odor. This is more frequently the case than one may suppose in the vegetable kingdom. Take, for example, the flower of *Pelargonium zonale*, which, under the improper name of red geranium, forms the borders of many gardens. This flower exhales an odor of the bedbug, or urinous in character. Now, with the aid of tweezers, gently detach its five petals one by one, and place them upon a sheet of inodorous paper or marble. Gather thus as many petals as you please, and you may be surprised to find that they give off no odor. Now examine what remains of the flower deprived of corolla, and it will be perceived that the calyx and pedicle are the sources of the odor. On closer observation, one may distinguish numerous little essence glands which cover these portions like a light down. It is to similar glands that the perfume of the calyx of the rose is due—when there is a perfume. The same is true in the case of the leaves of certain rose bushes when they are bruised. It may be remarked that if in a species the flowers and the leaves are both odoriferous the odors produced by each are plainly distinguishable. The flowers of the hundred-leaved rose possess the characteristic odor which is entitled "the odor of roses," but its leaves when bruised emit a peppery odor quite distinctive and different from the other.

The most common species having odorous leaves are those in which the flowers are inodorous. This is the case with *R. rubiginosa*, the leaves of which possess an agreeable odor of the rennet apple, which is perceptible at a distance, under certain conditions; *R. lutea*, whose leaves have an odor of lemon; *R. mollis*, *R. pomifera*, *R. tomentosa*; and, generally speaking, in all of the groups of *Tomentosa* the leaves give off, when bruised between the fingers, a disagreeable odor of myrrh and rosin.

Without going into a consideration of the details of the glandular organs of the leaf of the rose bush, it may be remarked that each of these delicate glands is composed of a support of more or less length, and a ball-like head which is the active portion. The oleo-resin which they secrete is accumulated about the top of the sphere, raising the envelope of cellulose which covers the gland, and forming a rounded drop which, seen in a hemispherical section of the secreting cells, depresses the latter. Upon the least pressure being applied, the pellicle of cellulose is ruptured, and the essence escapes and communicates its odor to whatever it touches.

The rose which serves best for this study of the glandular organs is the moss rose. However easy it may be to study the glandular apparatus of the green portions with the naked eye, it is quite impossible to do so in the case of the petals. It is evident, however, that such a secretion of odorous matter exists, as shown by the fact that it can be separated by distillation and yield what is known as the essence [or attar] of roses. However closely we examine the petal, we fail to discover the trace of a secretory organ. It is true that the upper surface of the petal is covered closely with minute conical papillæ, the purpose of which is, however, quite different. By virtue of the air retained between them, they give to the petals, especially those of a dark color, their velvety appearance. It is only by making sections that this problem can be settled. A fine section made with a razor, at right angles to the surface of the petal, as shown in Fig. 1, shows the petal to be composed of two superficial epidermis layers enclosing a loose-textured parenchyma. The upper layer shows the cells with papillæ above referred to. But there is no trace

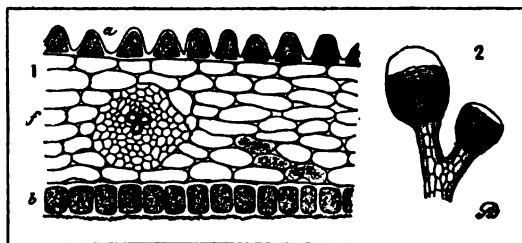


FIG. 1.—Section of a rose petal, treated with a 1 : 200 solution of osmic acid and seen with a microscope. a, Upper epidermis with papillæ. b, Lower epidermis with quadrangular cells. c, Parenchyma and fibro-vascular bundles. FIG. 2.—Leaf glands.

of secreting organs, and they cannot be found excepting by a resort to the following artifice: If the section is placed for several seconds (say fifteen) in a watery solution of osmic acid, 1 : 200, and then replaced in the microscope, one may observe in the cells of both epidermal layers the formation of large, bluish-black masses which are nothing else than a precipitate of metallic osmium, caused by contact with the essential oil. It is, therefore, the entire surface of the petal which secretes the odor (Figs. 1 and 2, a and b).

By means of other reactions it is shown that essential oil is in combination with a tannin and a fixed fatty matter difficult of isolation. It is probable that the volatile oil is formed from some decomposition of the tannin.

The cultivation of rose bushes for the production of the essential oil is, at the present day, chiefly in France and Bulgaria, but the last is alone entitled to the sobriquet of the *Land of Roses*, so long applied to the valley of Kashmere, in Persia. There once was a valley of roses in Kashmere, or rather at Shiraz, and Kaempfer, who visited it in 1684, gave a very curious description of it in his "Amœnitates" (ii., 373). But things have changed since that time, and the valley of Kashmere now produces only the oil of Palma-rosa—a sort of false rose oil. The magnificent gardens of the shah, where, under poetical circumstances, the attar of roses was first discovered in 1612, contain only a few giant rose bushes, preserved as curiosities, an example of which, as reported by Pissard, flowers to-day at Argenteuil in the garden of Mr. Godefroy-Lebeuf. One which Olivier saw at Teheran, about the commencement of the century, had a height of thirty feet. This is all that remains of roses in the "Land of Roses," and, by a curious reversal of things, the shah sends to Europe for the rose bushes for his own gardens.

At the foot of the Balkan mountains, in the ancient Turkish province of Eastern Roumelia, but belonging to Bulgaria since the revolution of 1885, is situated the most important industrial culture of roses, of which the two principal centres are Karlova and, above all, Kézanlik (see the map, Fig. 3). The plantations cover the two sides of each valley, but those upon the high slopes of the Eastern Balkans are by far the more important and in better condition than those which are opposite at Sredna-Gora. The

southern side of this latter range still bears several plantations, but only comparatively few. The several cultivations on the northern side of the Balkans have no industrial importance.

The two extreme points of the Valley of Roses are Koprivchutza on the westward and Tvarditza towards the east. The valley of the Strema is comprised in the district of Karlova (the ancient Turkish canton Giopça). That of Toundja is situated in the districts of Kézanlik and Nova-Zagora (Turkish Iené-Sagra). The districts situated on the southern slopes of Sredna-Gora are Nova-Selo (formerly Turkish canton of Kojim-Tepe), Brezovo (Karadscha-Dagh), Tchirpan, Stara-Zagora (Eski-Sagra). Far to the southward, at the foot of the Rhodopes (Despoto-Dagh), between these mountains and the Maritza, has lately been established a small culture, as yet without great importance, at Bradzicova (district of Pechtiza).

The present cultures of roses in Bulgaria have an appearance shown in Fig. 4. They are large sandy fields, in which the bushes are arranged in long rows and attain to the height of a man. The rows are from 1½ to 2 meters apart. Three species are raised; the first and only one really cultivated, and which represents 90 per cent of the roses, is a branching variety of *R. damascæna*, and the red rose of the Bulgarian peasantry. Its odor is not very marked, but exquisite. The second, known as the White rose, is, according to specimens which we have handled, a *R. alba*. Very few of the latter are cultivated, its flowers, owing to their faint odor, being but little esteemed by distillers. It flowers fifteen days later than the other, and it is never distilled alone, and is only planted on the margins of the plantations and at the ends of the rows to mark their limits and to offer to the depredations of passers only valueless flowers. The third variety is a dark red rose, known locally as the Rose of Constantinople; we have never obtained a specimen of the flower in good condition, but its leaf warrants its classification with the *Gallicanes*, to which group belongs *R. damascæna*. Its presence in the cultures is quite accidental.

The cultivation of roses is complicated and requires great care: pruning, frequent weeding and tilling between the rows, piling the earth about the foot of the shrubs at the commencement of winter to prevent the disastrous effects of frost, etc. Frost is really the greatest enemy of the rose bush, but not the only one. One of the most singular is a worm, or rather a larva, called *tchervé*, which penetrates the bark at times of great heat, and which excavates an annular passage around the branch, distinguishable from without by a slight enlargement. Upon handling, the branch breaks at this point as if it were a rod of glass. The flowering takes place from the 20th of May to the 20th of June.

In France, about Cannes and Nice, where roses are cultivated, the rows are from 1 to 1½ meters apart and situated on the sides of valleys exposed to the sun. The culture is of limited extent, and is conducted by the peasants, who are proprietors, and who dispose of the flowers at the large distilleries established in the adjoining town. The variety cultivated there is the hundred-leaved rose (*R. centifolia*), which flowers from the 20th of April to the 20th of May—a month earlier than in Bulgaria. Another variety belonging to the group of the tea rose, the Rose *safrano*, is raised during the winter, but gives flowers but slightly odorous and an oil of inferior quality. The distillers rarely receive them, the greater portion going to Parisian florists.

At Provins, during the middle ages, the *R. Gallica* (Rose de Provins) was cultivated in great abundance for the preparation of rose sachets, rose water, and, above all, for the famous confection of roses and honey. There exist

now in Provins hardly a hundred feet of rose bushes, and these in a particular garden. This industry, once celebrated, is now nearly extinct. The petals termed "Provins," still prescribed by the Codex, and still in use in pharmacy, are derived from the environs of Paris and consist of red roses of all sorts. The Department of Var furnishes for this purpose a variety of tea rose, known as *Cramosi supérieur*.—Abstract from paper in *La Nature* by DR. R. BLONDEL.

Coloring Matter from Chlorophyll.

A. HANSEN (*Bot. Centralbl.* 38, 632) prepares the yellow and the green constituents of chlorophyll in what he believes to be a pure condition by the following process: Some leaves of grass are boiled in water from 15 to 30 minutes, then washed many times with water and dried in the dark. The dry matter is extracted with boiling alcohol, and the solution saponified by boiling for three hours with a slight excess of aqueous soda; a current of carbonic anhydride is then passed through the solution, which is afterwards evaporated to dryness on the water-bath. Ether extracts from this soap the yellow coloring matter only, which is purified by evaporating down and crystallizing from a mixture of equal parts of ether and light petroleum.

The soap, after extraction with ether, is extracted with a mixture of alcohol and ether, which dissolves only traces of the combination of the green coloring matter with soda. On adding another quantity of alcohol-ether and also phosphoric acid, the green matter is liberated and passes at once into solution, from which it is obtained by evaporation in the form of a brilliant, fragile, greenish-black solid, insoluble in water, benzene, and carbon bisulphide, sparingly soluble in pure ether, very soluble in alcohol with strong red fluorescence. The crystals of yellow coloring matter form orange-red plates insoluble in water, soluble in alcohol, ether, chloroform, and benzene to a deep-yellow color, and in carbon bisulphide to a brick red. These crystals are transformed in the light into cholesterin. The author considers this yellow substance to be identical with the yellow coloring matter of flowers and fruits in general, including that of the carrot.—*J. Chem. Soc.*

Exalgine.—PROF. T. FRASER, in a recent clinical lecture, made some comments based upon his use of exalgine which may supplement what has already been published. Methyl-acetanilide, or exalgine (C_8H_9NO), occurs in colorless, needle-shaped crystals, which have a faintly aromatic odor and slightly pungent taste. It is nearly insoluble in water, but is freely soluble in rectified spirits,

and even in dilute alcohol. Professor Fraser finds that from 16 to 20 grains may be dissolved in one-half drachm of rectified spirit, and that this solution may be diluted with 3 or 4 ounces of water and still remain perfectly clear. As a solution so made, and containing one-half grain or 1 grain in a teaspoonful, has but little taste, it is generally used without the addition of any flavoring agent. Professor Fraser has used the remedy in doses of one-half grain, frequently increased to 1, 2, 3, and 4 grains, but seldom exceeding 14 grains per day, this quantity not inducing any bad results. The notes of the cases of neuralgia, etc., in which exalgine was used, show that in about ten minutes after the dose was administered relief was obtained. It was attempted to relieve pains of various kinds with the drug, but, as was to be expected, it failed in some instances, succeeding, however, in a wonderful manner in facial and other neuralgias, sciatica, toothache, cardiac angina, and even in one case of pleurisy. The doses which are most to be relied on are one-half and 1 grain.—*Chem. and Drugg.*, from the *Br. Med. Jour.*

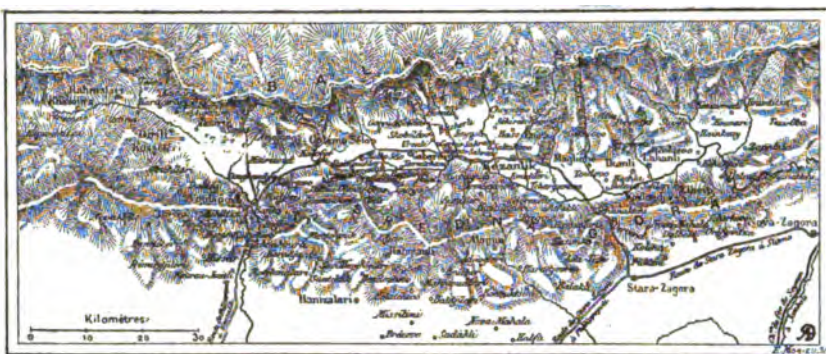


FIG. 3.—Map of the Balkan region devoted to rose culture.



FIG. 4.—A rose field at Kézanlik (after a photograph).

Notes on the Alkaloids.

At a recent meeting of the Society of Chemical Industry held at Edinburgh, Mr. D. B. Dott presented the following paper, which we take from the *Journal* of the Society:

There exists considerable diversity of definition of the term alkaloid, which is indeed regarded by Professor Armstrong as undefinable. The author objects to a definition which makes the term apply only to compounds of a markedly poisonous character or to compounds of a vegetable origin, considering that an alkaloid should be regarded as such on account of its constitution and chemical properties, and without reference to its source or physiological action. It is maintained that an alkaloid is any alkali-like or basic compound, whether of the NH_3 or NH_2 type, and that the term is also applicable to the basic compounds in which phosphorus or arsenic takes the place of nitrogen. The views enunciated by Professor Armstrong (*Jour. Chem. Soc. Ind.*, 1888) regarding the properties of nitrogen are criticised, the author contending that there is little evidence to show that nitrogen is a substance of great activity in the elementary or atomic as distinguished from the molecular state. A study of the alkaloids does not obviously confirm the theory, as many of these bodies, such as cinchonine and ecgonine, are physiologically very feeble substances, while on the other hand glucosides, like digitalin and strophanthin, are powerfully toxic. Whence it is hardly probable that the toxicity of the poisonous alkaloids is in any direct sense due to their nitrogen.

The remainder of the paper is occupied by some general remarks on the alkaloids and their salts. Although all alkaloids are probably potentially crystalline, some few have obstinately resisted all attempts to crystallize them. Among these is berberine. The author was the first to prepare a crystalline salt of that base (*Pharm. Jour.*, 1880), and was enabled to confirm the accuracy of the formula $\text{C}_{14}\text{H}_{14}\text{NO}_2$ ascribed by Flückiger from an analysis of the amorphous base. The hydrochloride crystallizes in trimetric prisms, which is the form nearly always assumed by alkaloidal muriates. Whence it is probable that many double salts of alkaloids could be prepared, although the double muriate of morphine and codeine is almost the only one which is prepared in practice. The custom (common in this country) of describing salts of the formula BHCl as hydrochlorates is condemned as erroneous, the expression more probably applying to the so-called chlorates, B.HClO_2 , hydrochloride being the more correct designation of salts of the former formula. Reference is then made to a question of some interest which has received very little attention. It is well known that while some of the alkaloids are strong bases, whose solutions turn red litmus blue, other members of the class do not affect litmus, and only form well-defined salts with the stronger acids. In some cases the combination of acid and base is so feeble that decomposition is caused by water.

It has not been determined which of all the known alkaloids is the strongest. The author tried a series of experiments to determine which of the opium bases is the strongest, by treating equivalent weights of two of them with an equivalent of hydrochloric acid in presence of water; and also, in some instances, by digesting a molecular weight of one salt in solution with a molecular weight of another alkaloid. Conclusive results are not always obtained. Codeine is the strongest and narcotine or narceine the weakest. Though doubtless the point is principally determined by the relation which the nitrogen bears to other groups in the molecule, it appears that the solubility is also a factor in the case. For instance, codeine is far more soluble, both in water and in alcohol, than is morphine, so that the former is in a more favorable position for combining with the acid. In the case of an alkaloid which forms two or more hydrochlorides, there cannot, as a rule, be any difficulty in determining which of the salts is normal. In the case of the cinchona alkaloids, however, which contain two nitrogen atoms of different value in the molecule, and form two platinic salts, the question is not so simple, hence in some books the ordinary quinine sulphate, $\text{Q}_2\text{H}_2\text{SO}_4$, is described as the basic, in others as the normal salt. It is a matter of old observation that several of the organic bases when precipitated by caustic alkali dissolve in excess, though it was not till a few years ago that Chastaing proved that this is due to the formation of definite compounds of the alkali and alkaloid. He regarded morphine as resembling phenol in so far as it contains a hydroxyl atom which readily allows its hydrogen to be replaced. This having been shown to be the case in regard to morphine, it became interesting to know whether other alkaloids which are readily soluble in alkalies contain a similar hydroxyl group. With this view the author and Stockman* experimented on narceine, but did not succeed in replacing a hydrogen by a methyl or ethyl group, by the method which easily effects the desired change on morphine.

In conclusion, reference is made to the alkaloids of the ammonium as distinguished from the ammonia type, it being considered that the former class have not received all the attention they deserve. This probably arises from

the fact that they have a tendency towards a similarity of physiological action. The author approves of the names used by Crum Brown and Fraser (*Trans. Roy. Soc. Edin.*, xxv., 693) as "methylnorphium iodide" and "ethylstrychnium chloride." The name "morphine methiodide" suggests a compound quite analogous to morphine hydriodide, which is misleading, as the former body does not yield morphine by any method of treatment, but always other products, and possesses also a physiological action quite distinct from that of the morphine salts. When morphine or codeine is heated in a sealed tube with hydrochloric acid, apomorphine is produced; but when the so-called "morphine ethochloride" is similarly treated, no apomorphine appears (unpublished experiments of the author), which is additional proof of the essential dissimilarity of the two classes of compounds. It seems not unlikely that these ammonium-like alkaloids may become chiefly useful as media for the preparation of new alkaloids, for as methylcodeium hydroxide yields, by heating with an alkali, the potent compound methocodeine (Grimaux, *Comptes Rendus*, xcii.), we may anticipate that an analogous action will occur in other instances.

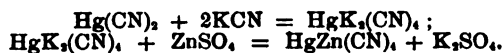
Note on Lister's Cyanide of Zinc and Mercury.

As a supplement to several articles previously published by us on the new antiseptic proposed by Lister (see especially our last number, page 48), we print here a portion of an elaborate paper by Prof. W. R. Dunstan, of the Research Laboratory of the Pharmaceutical Society of Great Britain. His object was to ascertain whether the new compound hit upon by Prof. Lister was a true double salt or not. Without quoting details, we may state that this was not found to be the case, but that under certain conditions cyanide of zinc is capable of obstinately retaining cyanide of mercury. We now quote the author's words (after *Pharm. Jour.*, February 1st):

... Of the four hypotheses as to the manner in which the mercury cyanide is retained in the new antiseptic, only one has stood the test of experimental verification—namely, that which supposes that the mercury cyanide is mechanically retained by the zinc cyanide. With this hypothesis all the facts perfectly accord.

Sir Joseph Lister has stated that the value of this intimate association of mercury cyanide with zinc cyanide as an antiseptic is largely dependent on its very slight solubility. It is therefore useless to expect that any good result would ensue from the employment of any soluble compound containing mercury, zinc, and cyanogen, as, for example, the remarkable compounds containing the mercury and zinc cyanides, combined with mercuric chloride, which have been lately described by Varet. For the present, at any rate, it seems probable that the substance which forms the subject of this communication will be largely employed as a surgical antiseptic.

It is, therefore, important that manufacturers should know how to prepare it of uniform composition. It has been shown in this paper that the amount of occluded mercuric cyanide contained in the material mainly depends on the quantity of water in which the reacting compounds are dissolved. By increasing the quantity of the water the occluded mercuric cyanide will be reduced to a very small amount, but by diminishing the quantity of the water as far as possible the amount of occluded mercuric cyanide may be raised to about 36 per cent; it does not appear to be possible to cause zinc cyanide to occlude a very much larger quantity of mercuric cyanide than this. The manufacturer will therefore have to employ as much water as will lead to the production of a substance which answers best as an antiseptic. So far Sir Joseph Lister has employed a material containing about 15 per cent of the mercuric salt, but he informs me that the presence of a larger proportion of occluded mercuric cyanide would probably enhance the antiseptic value of the substance. If this should be found to be the case, then the quantity of water used to dissolve the reacting compounds must be reduced to a minimum. It may, perhaps, be useful to mention the details of the process that has been found to answer best. Mercuric cyanide, finely powdered, is completely dissolved in a warm concentrated solution of potassium cyanide* and precipitated, when cold (12° to 15° C.), with a cold saturated solution of zinc sulphate.† The ingredients should be used in the proportions indicated by the equations:



The potassium cyanide should contain at least 95 per cent of KCN, but even then a small quantity of a zinc hydroxy-compound will be formed, but its presence to this small extent does not appear to be deleterious. The precipitate is washed free from mercuric salt with cold water, and dried, preferably over caustic soda or on porous tiles. If the substance be dried at 100° C., from 2 to 3 per cent of the mercuric cyanide will be rendered

* In order to prevent the crystallization of the mercury salt from the cold solution, 35 C.c. of water must be used for every 10 grams of mercuric cyanide employed.

† If the solutions are mixed while hot, more mercuric cyanide will be dissolved and less will be occluded in the precipitate.

* Unpublished experiments.

soluble in cold water. It is impossible to occlude the whole of the mercuric salt, because the presence of water during precipitation cannot be altogether avoided. If, with a view to economy, a smaller quantity of mercuric salt be employed in proportion to the zinc salt, mercuric cyanide is still dissolved and a diminished quantity is found to be occluded. Under the most favorable circumstances about half of the mercuric cyanide is washed away, but the salt may of course be recovered by evaporating the washings. Mercuric sulphate cannot be advantageously substituted for mercuric cyanide, since, although it can be dissolved in aqueous potassium cyanide, more water is needed to keep the products in solution, and therefore less of the mercuric salt is occluded.

The Manufacture of Compressed Yeast.

FROM a thesis "On the Manufacture of Compressed Yeast and its Detrimental Germ Impurities," presented by Alfred J. M. Lasché to the School of Pharmacy of the University of Wisconsin, we take the following description of the usual mode of manufacture:

a. *Preparation of the Mash.*—3,130 pounds of ground corn are mixed with 4,500 gallons of water. This mixture is heated to 190° F. (to swell the starch and thereby facilitate its inversion) and subsequently cooled to 154° F., then 1,920 pounds of ground rye and 550 pounds of ground malt are added (malt is especially employed for the amount of diastase it contains, and is indispensable in the converting process). This mixture is then allowed to stand one hour, and is finally cooled to 80° F. The proportions of the different grains are, of course, largely a matter of opinion, and the various yeast manufacturers have different working formulæ.

b. When this mash has cooled to 80° F. it is drawn off into another tub, and 1 gallon of concentrated sulphuric acid is added, in order to dissolve all the remaining starch, dextrin, and glutinous matter, and to convert them into grape sugar. Finally a quantity of compressed yeast is added to start the fermentation. This yeast settles to the bottom of the tub, but as soon as fermentation has started (usually in half an hour) and carbonic acid is being generated, a current of the latter carries the yeast to the top of the liquid. It remains there, covered by a layer of the chaffy parts of the grain, until the yeast has accumulated in a sufficiently large quantity and the current of carbonic acid has become strong enough, when it eventually breaks this film of chaffy particles and collects on the top of it in the form of foam. This goes on until all of the nutritive matter has been assimilated. The foam, containing all the yeast, rises about 2 feet above the top of the liquid, dependent on the size of the tub, and when no more effervescence is noticeable, fermentation is complete.

c. Immediately after fermentation has ceased, the foam is drawn off by means of troughs, and run, together with a fresh supply of water, into a revolving, six-sided, and declining cylinder lined with a sufficiently fine strainer. During this step of the process most all the chaffy remnants of the grain are separated, and the liquid, containing the yeast plant in suspension, is allowed to flow into a basin, whence, by means of a trough, it finally flows into a large tub.

d. The product in this tub is prevented from further fermentation by the addition of a sufficient quantity of ice. The yeast is now allowed to settle, the supernatant liquid drawn off, and the residue repeatedly washed to free it from all mechanical impurities.

e. When sufficiently cleansed it is run into a press by means of a steam pump. The press is constructed of a column of iron frames, either side of which frame being covered with a very fine straining cloth, and all the parts fitting tightly into each other. The yeast having been pumped into such a press, the water is separated from it by means of the strainer, and carried off through a waste pipe.

The yeast, now compressed, is taken out in the form of large cakes, and in this condition it is brought into commerce.—After *Pharm. Rundschau*.

The Dispensing of Digitalin.

THE Paris correspondent of the *Chemist and Druggist* reports on a discussion on digitalin recently held at a meeting of the Paris Société de Pharmacie, as follows:

M. Petit called attention to the vexed question of digitalin, or rather digitalins. As regards crystallized digitalin there is no difficulty when it is prescribed as such. The dose is one-tenth of a milligramme, and it makes but little difference whether Nativelle's or the German crystalline principle (by them called "digitoxin") or any other be employed. But the trouble is with amorphous digitalins. According to law it is this sort that should be dispensed when no remark is made by the prescriber, and the preparations offered in the market as amorphous digitalins are exceedingly variable in strength. Some, such as the Codex article, which are completely soluble in chloroform, are considered by good authorities nearly equal to the crystallized principle; but others must be much weaker, since they are taken in 1-Mg. doses,

which would be sure death with the pure product. As to the German sorts offered, they are of all varieties and prices, from less than 1 franc to 3 francs a gramme, not to speak of the so-called digitoxin. In consequence of this great variation; M. Petit moved that a commission be appointed on the question, so as to arrive at some agreement in regard to uniform practice in dispensing digitalin. The motion was unanimously concurred in, and MM. Petit, Marty, Wurtz, and Delpech appointed a committee to consider the matter and report.



AN IMPROVED BANDAGE ROLLER.

FOR over a year past a new bandage roller, devised by Mr. John Borham, one of the attendants, has been in use at Bellevue Hospital and several other public institutions. This presents some features which make it preferable to any other bandage roller we are acquainted with.



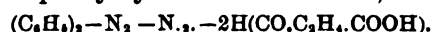
The apparatus will be readily understood by examining the illustrations. A piece of bandage muslin, of a width somewhat narrower than the inside space of the roller, is passed behind the metallic bar in front of the bottom board, then over the three wooden rectangular bars which at the same time secure the two side frames together, and, having been adjusted by its edge to the square steel axle, the latter is turned by means of a winch, thus winding the muslin tightly and smoothly upon the axle in any thickness compatible with the distance of the nearest bars. It will, of course, be readily understood that during the passage of the strip of muslin over the several sharp-edged wooden bars, every crease and unevenness is removed from it, so that the final roll produced upon the axle is perfectly homogeneous. The axle itself is slightly tapering from the winch towards the other end, and when the roll has arrived at the proper thickness, and the muslin has been cut, it is simply pulled out. The roll may then be cut with a sharp, flat-bladed knife into bandages of any desired length.

Orthrine—a New Antipyretic.

UNDER this name, Prof. Kobert recommends as an antipyretic a new derivative of phenylhydrazin, which has been obtained by the combination of hydrazin with paroxybenzoic acid. This new body, orthohydrazin-paroxybenzoate, is very unstable, but unites with hydrochloric acid, forming the hydrochlorate of orthrine, which is stable. Clinical experiments made with the new antipyretic by Prof. Unverricht show that, in 30 to 50-C.c. doses, orthrine acts in typhoid fever, pneumonia, and articular rheumatism generally with great energy; but it is uncertain, and its advantages are slight compared with its disadvantages, amongst which are profuse perspiration, collapse, and symptoms of intoxication. Michaelis has recently mentioned two other hydrazin derivatives which possess antipyretic properties; these are acetylenephénylhydrazin,



and ethylenephénylhydrazin succinic acid,



These two substances are yet on clinical trial, and it is to be hoped that they will have shorter names if they are to go down to posterity.—*Chem. and Drugg.*

Summary on Practical Manipulation.

MR. H. N. WARREN publishes some practical notes on various chemical manipulations in the *Chem. News* (February 7th and 28th):

Precipitation.—Among the numerous operations that are performed in the laboratory, none are perhaps oftener employed than that of precipitation. Many precipitates—not among the least of which noted for tedious and imperfect filtration may be mentioned those of barium sulphate and calcium oxalate—when recently precipitated pass in considerable quantity through the pores of the paper. This may naturally be considerably retarded by employing both solutions at the boiling point. But even then considerable risks are entertained, combined with grievous waste of time. The addition of starch paste has been recommended by several experts, but the same investigators omit to state what percentage of sulphide they obtain after ignition. I may mention, as an improvement, the following method: Employ both the reagent and the solution containing the sulphate at an elevated temperature; at the same time introduce a few drops of ethereal solution of pyroxylin; and mix well with the precipitate by stirring; the pyroxylin is at once set free, and, mixing intimately with the precipitate, allows of an immediate filtration. The separation of iron from manganese by means of sodium acetate is well known to be amongst the bulkiest precipitates obtainable for practical purposes; yet if, at the boiling temperature, there be added to the precipitate finely powdered glass, it at once mechanically subsides, and, if dexterously performed, may be filtered and washed with impunity. As a third instance may be mentioned the effectual separation of precipitates occasioned during the manufacture of the pharmaceutical preparations, one of the most obstinate being the *Tinctura Rhei* of the British Pharmacopoeia.

A sample of this description which was lately presented to my notice has been, by the manufacturers, several times ineffectually passed through various commercial filters. The sample referred to, which was, when received, of a deep cloudy slate color, due to suspended insoluble matter, was, after a short digestion with a small quantity of egg albumen, entirely freed from coherent matter by ordinary filtration. I may also mention that paper pulp distributed throughout the solution retains very perfectly any finely divided substances.

Incineration.—In cases where the total ash is required, such as the incineration of organic substances—among which may be mentioned the analysis of beet-sugar—so imperfect is the combustion of the organic matter, on account of the easily fusible salts which impregnate it, that the addition of a small quantity of H_2SO_4 is required in order to convert the inorganic salts present into sulphates, and thus render them less fusible, correction for increased weight being afterwards deducted.

The imperfect combustion of carbon when in contact with phosphates, especially in the case with magnesium phosphate, tends to increase errors; in which case, I have observed, several authors recommend the use of ammonium nitrate as a consumer of the carbon. I have, however, frequently used with success a plug of guncotton, omitting altogether a filter paper.

Precipitation Retarded.—Several organic acids or salts of the same are well known to retard the precipitation of metals when in solution. Among the most formidable are the tartrates and oxalates, also the citrates, which are not unfrequently unintentionally formed by the incautious filtration of strongly acid liquors through organic membranes; these may be altogether prevented by the employment of wool glass. They are not, however, by any means the only acids that present a retarding action, one of the most opposing being hydroferrocyanic acid. So powerful is the action of this acid, when in solution, towards the salts of tin, as not only to render the sulphide of tin unprecipitable, but even to immediately decompose it into the ferrocyanide after its formation.

Reading of Definite Quantities from Measured Flasks.—At the moment it may be desirous of denoting the exact capacity of a measured instrument, say, for instance, the reading of a measured flask, it not unfrequently happens that an accumulation of either froth or air bubbles obliterates the dimension. These may be immediately expelled by the addition of one drop of alcohol.

Disintegration.—The pulverization of many substances, before operating further upon the same, not unfrequently presents one of the most irksome and troublesome undertakings that are to be met with in a laboratory, especially when adopting the general method of pestle and mortar. Quite recently small disintegrators have been supplied for practical purposes; but the present costliness of the articles considerably retards their general application. In cases where it is required to produce to powder, such as, for instance, the pulverization of minerals, several pounds may be quickly reduced to any mesh by the application of a smooth iron plate, replacing for a pestle a large flat-headed hammer, and giving to the same a rotary motion, so as to constantly bring the same particles under its influence.

Casting and Moulding.—After the assay of a metal has

been completed, it not unfrequently happens that a sample of the same is required in an elongated form in order to examine its tensile strength or other physical features. A very ready mould, and one which answers the purpose admirably on account of the non-introduction of foreign substances, may be formed by coiling round an ordinary pencil, or other convenient appendage, several thicknesses of writing paper, closing the extremity by means of a cork, and supporting the same by immersing it to the extremity into dry sand, afterwards withdrawing the core and pouring into it the intended metal. A very perfect and uniform cast is thus obtained, which may be tested by weighting the same from about every other inch in length. By this means a very good indication will at once be formed whether any liquation has preceded the casting, on account of the inconstancy either of the metal or alloy that has thus been treated. These paper moulds are not intended for metals above the melting point of zinc; for copper, iron, etc., asbestos sheeting should be used in its stead.

Combustion Tubing (how to preserve).—During a tube combustion, employing the ordinary glass tubing in general use for that purpose, direct contact of the contents will oftentimes be observed to cause, either whilst hot or when cold, a fracture of the glass, and thus prevent further use of the same; a thin strip of asbestos placed next to the glass will, in many cases, prevent breakage, and thus preserve the same tube for various further operations. Many combustion estimations may be accurately performed in an iron tube.

Unsuspected Impurity of Acids.—The impurities of the various commercial acids are generally well known, and the foreign substances most frequently found contaminating them are naturally sought for before employing the purer acids. As a rule, however, nitric acid, excepting small quantities of sulphates and chlorides, is usually supposed to escape contamination. I may, however, mention that I have frequently detected selenium in a so-called pure acid. As the acid was intended for parting gold, on account of the vigorous way in which selenic acid attacks that metal, it might, if it had escaped detection, cause considerable errors. It would be interesting to know to what extent of division the millionth part of a grain of gold would become if subjected to such an impurity.

Keratin-Coated Pills.

It matters not, according to *Merck's Bulletin*, what medicaments are used in pills, provided they be worked up, and maintained, sufficiently dry to keep their contents from mingling with, or injuring, the keratin coating. The pills, therefore, must not only contain no appreciable moisture, but also no hygroscopic substances (such as most vegetable excipients); for evaporation in the one case might cause the pills to shrink, and absorption of moisture in the other might make them swell—thus in either case destroying the continuity of the keratin coating, and thereby foiling its purpose. The body of the pill mass may consist of a mixture, by fusion, of 1 part yellow wax with 10 parts tallow or cacao butter. Kaolin, bole, or charcoal powder may be employed as excipients.

The pills, when made from a mass prepared on the above principle and duly medicated, are, according to Dr. Bernhard Fischer, to be immersed in melted cacao butter for a moment, and then rolled in graphite powder to smooth them; then they are coated with keratin by rolling them in a solution thereof until the solution is evaporated, repeating this process (perhaps as many as ten or twelve times) until the coating is thick enough. The sufficiency of the coating may be easily determined by having a few trial pills, with, say, three-quarters of a grain of calcium sulphide in each, along with the lot to be coated, and having these of different size from the others so as to distinguish them. If one of these calcium-sulphide pills be taken, and no eructation of sulphuretted hydrogen take place within a few hours thereafter, it may safely be assumed that the coating is sufficient.

In preparing the pill mass, fatty medicaments may be united with melted wax or a cerate; while aqueous infusions or liquid extracts may be thickened up with acacia or tragacanth powder, and, if need be, with some vegetable or mineral powder as little apt to swell in water as can be selected. A cerate may be added then, if it be compatible and miscible with the rest of the mass.

The solution of keratin for pill coating is made by either of the following methods:

1. Ammoniacal solution: 7 parts keratin; digest (warming, if necessary) in a mixture of 50 parts 10-per-cent ammonia water and 50 parts 60-per-cent alcohol.

2. Acetic solution: 7 parts keratin; digest (warming, if necessary) in 100 parts glacial acetic acid.

The ammoniacal solution is adapted for pills containing pancreatin, trypsin, bile, iron sulphide, etc.

The acetic solution is adapted for pills containing salts of silver, gold, mercury, iron chloride, arsenic, creosote, salicylic acid, hydrochloric acid, etc.

In the case of chemically neutral substances compatible with either solution, as, for instance, naphthalene, it is immaterial which solution is employed.—*Chem. and Drug.*

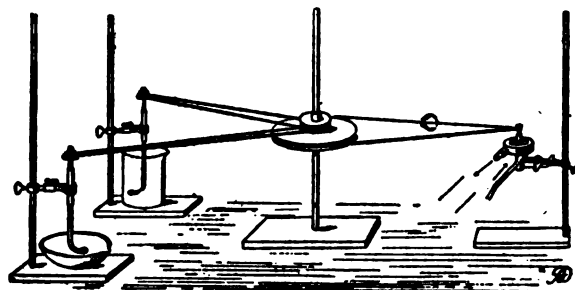
STIRRING APPARATUS.

THE use of the well-known water motor or water turbine is gradually becoming more general. E. Sauer shows (see cuts) how it may be utilized for stirring. While this is not new—one of us having used a similar apparatus years ago—yet there are some features about the arrangement which will be interesting to our readers. It is only necessary to say that the water motor is a wheel enclosed in a metallic case, and the wheel set in motion by a stream of water under pressure. The transfer of motion from the motor to the stirrer is easily understood from the cuts.—*Chem. Zeit.*

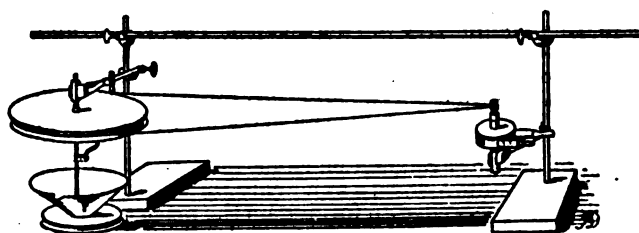
Notes on Peroxide of Hydrogen.

At a recent meeting of the Society of Chemical Industry, Prof. Kingzett read a paper on "Peroxide of Hydrogen, its Preservation and Commercial Uses," from which we take the following (after *Journ. of Soc. of Chem. Ind.*, January 31st):

Apart from the previously well-known oxidizing properties of peroxide of hydrogen, it was proved for the first time by some experiments, of which an account was presented by me to the British Association in 1876, that this substance exhibits striking antiseptic effects, and is capable, even when present in very small proportions, of entirely arresting processes of fermentation which are originated by living organisms. The antiseptic properties of the substance were subsequently confirmed by the observations of Guttman and Fraenkel in Germany. Later still, some similar observations were made by M. Baldy, who concluded that peroxide of hydrogen is in no respect inferior to carbolic acid.



Sauer's Stirring Apparatus.



M. Paul Bert and M. Regnard confirmed my own earlier experiments, they showing (*Comp. Rend.*, 94, 1383-1386) that an extremely dilute solution of peroxide of hydrogen prevents the fermentation of glucose by the agency of yeast, prevents mycdermic growth in red wines, lactic fermentation in milk, and the putrefaction of albumen, etc. On the other hand, they found that it was incapable of arresting the changes which are induced by soluble non-organized ferments, such as diastase. This distinction is of importance, because if peroxide of hydrogen be employed for internal administration it affords a guarantee that the presence of that substance in the human system will not arrest or interfere with the many assimilative and other processes which are carried on by means of ferments of the pancreatic type.

It was, therefore, to be expected that this compound would be found of peculiar benefit for the treatment of wounds, and for general use in the practice of antiseptic surgery; and that anticipation has been amply realized in the practice of M. Baldy, M. Regnard, and particularly that of M. Péan in the Hospital of St. Louis. It has been demonstrated beyond question that all wounds which are treated with peroxide of hydrogen progress well, healing by first intention, all discharges being healthy in character and free from odor. Chronic ulcers are similarly treated with the same successful results, so also cases of gangrene, fetid suppurations, and bad ozænic discharges.

M. Péan performed many important operations in an atmosphere impregnated with peroxide of hydrogen instead of carbolic acid, and M. Baldy employed gauze and wool which had been soaked in peroxide, for placing in contact with wounds by means of bandages where prolonged contact was desirable. He also found that it might with safety be used as an injection for washing out cavities.

Dr. A. W. Harlan, in a paper read before the American Dental Society (*Dental Record*, November, 1882), strongly recommended the use of peroxide in the treatment of blind alveolar abscesses and pyorrhœa alveoli, because the rapid evolution of oxygen gas effects a thorough evacuation of the pus without creating any undesirable after-effects.

M. Landolt, of Paris, and Dr. J. E. Adams, of the London Hospital and Royal London Ophthalmic Hospital, have both used peroxide of hydrogen with great success in cases of purulent discharge from the conjunctiva (see *British Medical Journal*, December 9th, 1882).

Since October, 1885, Professor Hofmooke has employed

peroxide with the greatest advantage in the treatment of diphtheria, while for syphilitic and cancerous swellings, and wounds generally, it is now in everyday use by many of the most eminent surgeons at home and abroad.

In a recent paper (read before the Kings County Medical Association, February 5th, 1889, during a discussion on diphtheria), Dr. E. R. Squibb, of Brooklyn, says: "If diphtheria be at first a local disease and be auto infectious—that is, if it be propagated to the general organism by a contagious virus located about the tonsils—and if this virus be, as it really is, an albuminoid substance, it may and will be destroyed by this agent upon a sufficient and sufficiently repeated contact."

Peroxide of hydrogen never fails to thoroughly cleanse all mucous surfaces. It not merely exhibits the power of destroying pus and other products by oxidation, but it is admitted by the most reliable bacteriologists to be an exceedingly powerful germicide, ranking, perhaps, in this respect next to biniodide of mercury, while, as distinct from that substance, it is quite non-poisonous.

As all air-breathing animals depend upon atmospheric oxygen for their very life, it stands to reason that for all diseases that are in any way dependent upon defective oxidation peroxide of hydrogen is the best natural remedy, being a solution of oxygen in chemical combination with elements of water.

With respect to the use of peroxide of hydrogen for bleaching, a summary statement will suffice. It has been used, and is being used, with success for bleaching wool and woollen goods, silk (particularly tussah), ostrich feathers, living and dead human hair, sponges, ivory, bone, wash leather, horn, gut, wooden articles, etc. It may also be employed for bleaching cotton, fine yarns, and textiles, but not so successfully as for woollen goods. For such bleaching purposes tanks or vessels of wood, glass, or earthenware are employed. Metallic vessels have to be avoided. The general method of procedure consists in freeing the articles from dirt and grease by

washing them with ammonia water or with dilute soda or carbonate of soda, and after having thoroughly rinsed them out they are immersed in the solution of peroxide of hydrogen, sometimes used of 10 volume strength and at other times of only 2-volume strength; frequently ammonia or some other alkali is added to the solution of peroxide in order to facilitate the bleaching.

The operation of bleaching is generally carried out at a temperature of about 30° to 50° C., heat being employed in the form of steam carried through a leaden coil immersed in the bath.

As I have previously pointed out, the addition of an alkali in order to hasten the effect is made at the expense of using an extra amount of peroxide, and in my opinion borax would replace it to advantage where it is necessary to employ such an agent for facilitating the operation.

[*Note by Ed. Am. Drugg.*—According to the English Patent, No. 15,993, granted to C. T. Kingzett, of London, peroxide of hydrogen in aqueous solution may be preserved by adding to it a small quantity, say one per cent, of any of the following substances: alcohol, acetic acid, chloral, chloroform, or glycerin. Alcohol is the preferable preservative.]

Reaction for Cocaine.—The cocaine to be tested is dissolved in water, and a drop of ferric chloride solution is added. On boiling the solution, an intense red color is developed, owing to the formation of benzoic acid. Benzoyllecgonine also gives this reaction, but this substance differs considerably from cocaine in melting point and solubility. Cocaine is readily soluble in ether; benzoyllecgonine is not soluble.—O. LEROH and C. SCHÆRGES in *Schweiz. Woch. f. Pharm.*

Expenses of the London Hospital for medical supplies and stimulants during the year 1889 were 7,060l. 9s. 8d. Drugs and chemicals came to 3,858l. 5s. 4d.; wines, 88l. 10s. 5½d.; spirits 425l. 7s. 7d. (brandy alone 345l. 3s.); plasters 290l. 15s. 2d., and the remainder on sundries, which include all surgical appliances, invalids' food, bottles, etc. Among the supplies we find enumerated gum arabic 208 lbs., cocaine hydrochlorate 44 oz., chloral 9½ lbs., sulphonal 74 oz., antipyrin 350 oz., homatropine sulphate 649½ grains, ichthyol 18 lbs. (increase), lanolin 35 lbs. (decrease), vaseline 3,750 lbs. (increase), menthol cones 66 doz., iodoform 244 lbs. (increase), sublimate gauze 2,066 yds. (decrease by nearly one-half from 1888), etc.

The Reddening of Carbolic Acid.

THE reddening of carbolic acid has long been a subject of controversy. The latest contribution on the question is made by Schneider (*Pharmac. Centralhalle*), who made sundry experiments to determine whether the new synthetic carbolic acid was subject to reddening in the same degree as the coal-tar product. Schneider placed samples of liquefied acid (both synthetic and coal-tar) along with specimens of cork, wood, zinc, tin, lead, iron, and other materials. The samples were put away for three months, at the end of which time the synthetic acid placed with the materials named had become slightly yellow, and the coal-tar acid samples more reddish yellow. Synthetic acid, placed in contact with metallic copper, became vivid red after a few days, and this color remained constant at the end of a period of three months. With coal-tar acid the red was assumed even more rapidly, but in this case the sample quickly changed into a brown liquid. The author concludes from his experiments that that view is most likely to be correct which ascribes the reddening of carbolic acid to the presence of a slight impurity of copper, originating from the use of copper distilling apparatus. If mixed with ammonia solution and alcohol, synthetic carbolic acid acquires the characteristic blue coloration of copper, as does the coal-tar acid, though not so rapidly.—*Chem. and Drugg.*

Notes on some Gum Samples.

MR. T. MABEN, at a meeting of the North British Branch of the Pharm. Soc. of Great Britain, reported the results of a study of some commercial gums. There were twenty-one samples in all, and they comprised Egyptian, East Indian, West African, Cape, Australian, and Brazilian gums. Commencing with a sample of picked Kordofan gum, which showed the characters of the best acacia gum, Mr. Maben gave a short historical notice of the course of trade in this commodity during the past few years, and then referred briefly to Geddah gum, Aden gum, and Ghezirah and Talca gums. Two samples of Senegal gum ("gomme du Bas du Fleuve" and "gomme de Galam") were shown and described, and an account was given of the gum trade on the Senegal River. This trade is entirely in the hands of the French, and some few years ago the Bordeaux merchants formed a syndicate for the control of the article, and succeeded in forcing up the price from 52s. 6d. per cwt. in January, 1885, to 125s. in April, 1888. Since that time there has been a gradually slackening demand, and in the last market report of the *Chemist and Druggist* (February 15th) it was stated "that there has been a serious decline in the price of Senegal gums, both varieties being easily obtainable at 85s. per cwt." Many of the so-called Arabic gums now met with were said to consist of a large admixture of Senegal gum.

There were shown three samples of Barbary or Mogadore gum. White Barbary, the best variety of the three, is not unlike Turkey sorts, but is rather dirtier. It is perfectly soluble in water, gives a bright transparent mucilage, free from odor, and keeping well. This white gum is an import of rather recent date, and is thought by some to be a Soudan gum, which now finds its way by a diverted route to the northwest instead of the northeast of Africa. Five samples of East Indian Amrad gums were shown. These have already been described by Mander, and were only briefly referred to. Special attention was drawn to Cape gum, of which three samples were shown. Two varieties of this gum are imported—one the hard brown Cape, which is obtained from *Acacia horrida*. This has been known for many years, and is described in "Pharmacographia"; but more recently, since the closing of the Soudan, another variety has been regularly consigned to the London markets. This is "soft white Cape," which is supposed to be gathered in the northern parts of Cape Colony, beyond the Orange River. A sample of fine picked white Cape showed as fine an appearance as any Kordofan gum, and so like is this to the old Turkey gums that it is thought by some that the white Cape is simply what we formerly received from the Soudan, and which is now brought by Arab traders right across Africa. This is a doubtful hypothesis, however, for if gums found their way so far south we would surely receive some by way of Zanzibar. Australian gum was next touched upon. This gum gives a thin mucilage which on standing separates, a brownish deposit settling down, with a pale, clear supernatant mucilage. The pure gum contains no tannin, but associated with it are pieces of wood, which impart a trace of tannin unless they are removed. The market for Australian gum is limited to England, but it is said to be employed to a considerable extent in Russia and Sweden. Three samples of Brazilian gum were shown, one of which was sent to Mr. Maben by Mr. E. M. Holmes from the museum at Bloomsbury Square. This gum occurs in large dark-amber or dark-brown glassy drops, and is soluble in water. The mucilage made from it is thick, but only moderately adhesive. Ghatti gum was described, and Mr. Mander and Mr. Prebble were quoted for information regarding it. The author did not regard Ghatti gum with so much favor as Mr. Mander, chiefly owing to the disagreeable mawkish flavor, which he thought would prove an obstacle to its general employment in pharmacy.

Oomra gum, or, according to Prebble, "Babool gum," was shown. This gum gives a dark-colored, adhesive, viscid mucilage, which for many purposes might be useful. Referring to the relative value of the different gums for pharmaceutical purposes, the author said that the dark-colored gums, or gums which gave a dark-colored mucilage, might be at once dismissed from their notice, for, however valuable many of them might be in the arts or for the purposes of the confectioner, it was obvious that they were unsuitable in pharmacy. There remained not very many to pass an opinion upon, and these he was disposed to place in this order: Cape gum, Senegal gum, Barbary gum, the paler varieties of E. I. Amrad gums, and Ghatti gum. All these possessed good emulsifying properties, and gave a clear, good-keeping mucilage. A summary of the transactions in gum recorded in the *Chemist and Druggist* market reports was given. According to this there had been sold during the last few months:

	£	s.	d.	£	s.	d.
Brazilian gum.....at from	1	8	0	to	3	0
Aden gum, scented	1	10	0		3	0
" " unscented	3	0	0		4	10
Oomra gum.....	2	0	0		2	19
Australian gum...	1	5	0		3	4
Ghatti gum.....	1	8	0		4	14
Geddah and Talca.	4	5	0		4	15
Amrad gums.....	2	0	0		5	5
Cape gums.....	2	0	0		5	5
Barbary or Mogadore gum.....	2	2	0		5	12
Senegal gum.....	4	2	6		5	15
Turkey gum	5	0	0		16	10

In addition to these, parcels of Cape gum have been sold for £14 10s., and Mogadore for £14 5s., while £25 per cwt. was asked for a parcel of fine Turkey.

The reactions of the various mucilages were gone into. All the samples gave precipitates with alcohol and ammonium oxalate, although with the latter Brazilian and Australian gums gave only faint reactions. With borax, acacia mucilage hardened into a gummy mass; similarly with basic lead and ferric chloride, while it gelatinized and formed a softer mass with silicate of potash. Generally speaking, similar reactions were obtained with Senegal gums, the E. I. Amrad gums, white Barbary, the Cape gums, and Geddah gum. Barbary brown and Amrad give only a jelly with borax. Australian gum has no reaction with ferric chloride and potassic silicate; Brazilian gum has no reaction with potassic silicate, but gelatinizes with borax and ferric chloride, and slightly with basic lead. Ghatti gum gelatinizes with all four, but only slightly with potassic silicate. Oomra gum reacts similarly to acacia, except that it is entirely unaffected by basic lead, and forms a softer jelly with ferric chloride.

The Chairman thought the communication was a very interesting one. Mr. Boa was inclined, from experience, to rank Ghatti gum as higher than Mr. Maben had placed it.—*Chem. and Drugg.*

Toxicological Notes on Opium.

PROF. HILGER, of Erlangen, in connection with Paul Küster, has made a study of the methods proposed for detecting opium, or rather its most characteristic alkaloids, in toxicological investigations. From the authors' paper in the *Mittheilungen aus dem pharmaceut. Institut, etc., der Univ. Erlangen* (ii. 291) we give the following abstract:

A preliminary study of the proposed methods led to the conviction that when phosphomolybdate of sodium or iodohydrargyrate of potassium had been used as precipitants of the alkaloids, it was never possible to isolate the latter in a colorless condition, even when the precipitates were produced in solutions of the pure alkaloids. Of course, to identify the separated alkaloids, it is necessary that they be obtained in as pure and colorless a form as possible.

A series of experiments were now undertaken to ascertain whether it was not possible to extract the alkaloids by suitable solvents, without taking along coloring matter. A successful method was discovered, which involves the use of plaster of Paris. The latter is well known to have the property of absorbing coloring matter and then yielding it only with difficulty to solvents.

Ten Gm. of opium were twice extracted with alcohol containing tartaric acid. The extract was freed from alcohol, and the aqueous residue made into a paste with plaster of Paris. When this had solidified it was reduced to powder. To set the alkaloids free, it was treated with a concentrated solution of sodium carbonate, and then again dried on a water-bath. The dry mass was now extracted with ether, during three hours, in a Soxhlet extractor. The ethereal solution had only a slight tint. On distilling off the ether and dissolving the residue with very dilute hydrochloric acid, it was easy to demonstrate in the solution the presence of morphine, codeine, and narcotine. The mass was then taken from the extractor, dried to dissipate the ether, then put back and extracted with chloroform, which resulted in a much more decidedly colored solution. On dissipating the chloroform and dissolving the residue as before, it still gave decided proofs of the presence of morphine and narcotine. If

the mass was then finally extracted with alcohol, the liquid obtained had a very dark color, and was found to contain still a considerable quantity of the alkaloids when tested with the usual precipitants.

It will therefore be seen that ether is the best solvent when it is necessary to obtain morphine, etc., as free from tint as possible. Yet it is only a feeble solvent, and it is therefore necessary to extend the time of extraction (to 6 or 10 hours) if satisfactory results are expected.

After giving in detail the results of certain experiments instituted to determine the action of ether upon the acidified or alkaline mass, etc., the authors finally recommend the following improved method to detect opium, or, rather, to detect narcotine, codeine, and morphine in forensic analysis:

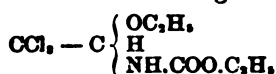
Reduce the substance to be examined to a comminuted state, if necessary, and extract it twice with water acidulated with tartaric acid. This is best done by triturating it with the solvent to a thin magma, and digesting, each time, during one hour at a temperature of 50° to 60° C. Allow the mass to cool to 30° C. and separate the liquid portion. A good method to accomplish this is to transfer the whole mass to a filter which is provided a little above its point with a sieve plate, then to connect with the filter pump. In most cases it will be found impracticable to use a flannel strainer or paper filter. Now evaporate the obtained liquid upon a water-bath to the consistence of a thin extract, mix with about 25 Gm. of plaster of Paris (dehydrated), and warm for a little while on the water-bath so that the mass may become dry, which will take place in about 10 minutes if the gypsum was of good condition. Reduce the colored mass (which has an acid reaction) to powder, transfer it to a Soxhlet extractor, and extract it during three hours with ether. The ethereal extract, that is, the residue left after the evaporation of the ether, contains narcotine in so pure a state that it may be readily identified.

Next deprive the acid mass of the residual ether, mix it with a concentrated solution of sodium carbonate until it has a strongly alkaline reaction, dry it on a water-bath, and extract it again with ether in a Soxhlet apparatus during six hours. Towards the end of the operation it will be noticed that small crystals (of morphine) appear on the walls of the flask in which the ether is kept boiling. These may be removed, after the operation is completed, either with a brush or a small spatula, and readily identified as morphine. (It has first been observed by Poellnitz and confirmed by Dragendorff that when morphine is dissolved in ether it gradually passes from an amorphous to a crystalline condition, in which latter form it is extremely little soluble in ether.)

Now evaporate the ethereal solution, dissolve the residue in water acidulated with hydrochloric acid, and shake with chloroform, which will remove the last traces of narcotine. (It may be readily recognized after evaporating the chloroform.) Free the aqueous liquid from traces of chloroform by warming, render it faintly alkaline, and shake it with ether, which will take up the codeine. On evaporating the ether, very handsome and sharp reactions for codeine are obtained. Next proceed to extract the morphine, most of which is still present in the mass. This may either be accomplished by means of amyl alcohol, after Stas, or in the following manner devised by the authors:

Remove the residuary mass from the extractor, acidulate it, and extract it with alcohol. Free the dark-colored extract from alcohol, dissolve the residue in water acidulated with hydrochloric acid, mix it with freshly precipitated and well-washed aluminium hydrate, and warm gently. This results in the production of a lighter colored (yellow) filtrate, the alumina retaining some coloring matter but no alkaloids. Now add to the filtrate some freshly precipitated lead oxide and enough subacetate of lead solution to produce an alkaline reaction. Mix the lead precipitate with sand, dry the mixture, and extract it with chloroform. Upon evaporation of the latter, the residue will give the reactions of morphine.

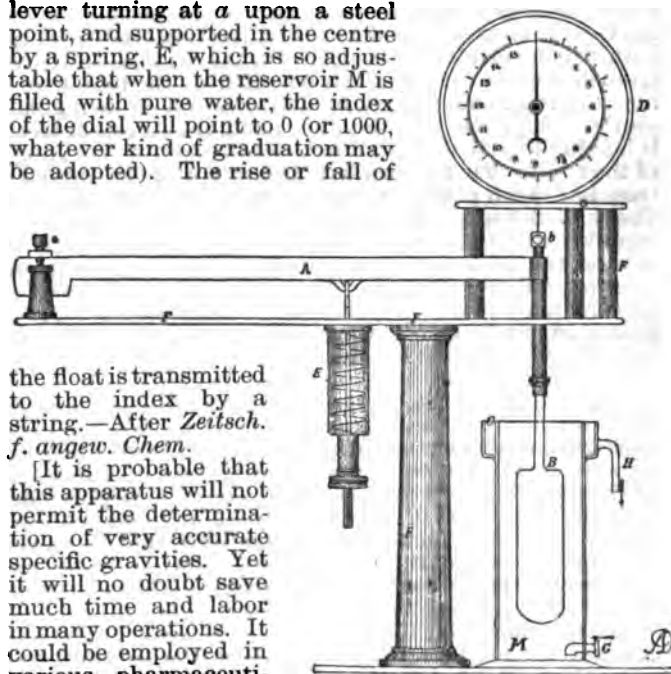
Somnal.—Radlauer has patented and brought upon the market a soporific to which he assigns the formula



which is the substance known as *somnal*. He prepares it by heating a mixture of equal parts of chloral hydrate, urethane, and alcohol to 100° C. E. Ritserd disputes the possibility of such a mode of preparation; there is no evidence of any reaction occurring when these bodies are mixed cold, no chloral ethylate is formed at 100° C., and chloral urethane is decomposed at 100° C. Although chloral hydrate will give no reaction, chloral will, and one obtains chloral alcoholate or chloral urethane according to the order of addition of the reacting substances, the product being in one case unattacked by the subsequent addition of alcohol, and in the other of urethane. "Somnal" is therefore nothing but a mixture of chloral hydrate, urethane, and alcohol.—*Pharm. Zeit. and Journ. Soc. Chem. Ind.*

A NEW SPECIFIC GRAVITY INDICATOR (BARESCOPE).

J. V. DIVIS has constructed an apparatus which permits the quick reading off of the specific gravity of a liquid. The apparatus is specially designed for liquids which are obtained in large works, and which are of a gradually increasing or decreasing specific gravity; for instance, mother-liquids, saccharine or glycerin solutions, lixiviation waters, saline solutions, etc. Any of these liquids is conducted into the reservoir M through the tube G, and passes out through H, thus maintaining always the same level. The reservoir contains a float, B, which is buoyed up by the liquid in proportion to its density. The float is carried at the end of a lever turning at α upon a steel point, and supported in the centre by a spring, E, which is so adjustable that when the reservoir M is filled with pure water, the index of the dial will point to 0 (or 1000, whatever kind of graduation may be adopted). The rise or fall of



the float is transmitted to the index by a string.—After *Zeitsch. f. angew. Chem.*

[It is probable that this apparatus will not permit the determination of very accurate specific gravities. Yet it will no doubt save much time and labor in many operations. It could be employed in various pharmaceutical operations on a

large scale, by making any liquid product pass through the reservoir M, so that the process may be interrupted when the density of the product falls below a certain point. If the index be connected with an electric alarm, and the point of contact can be set at will at any point of the scale, the apparatus would automatically signal the moment when the product would be on the point of falling below a set standard.—*Ed. AM. DRUGG.*]

New Process of Titrating Alcohol with Chromic Acid.

R. BOURCART has devised a new process of titrating alcohol. First the diluted alcohol is heated with dilute solutions of potassium bichromate and sulphuric acid, and gradually oxidized, first to aldehyde and then to acetic acid. The conversion is quantitative. As is easily seen, two-thirds of a molecule of bichromate are required for the oxidation of one molecule of alcohol. The author operates in tubes sealed at both ends, or in a tube sealed at one end and closed at the other with a caoutchouc stopper, the end of which is secured in any convenient manner. After being heated for two to three hours in a boiling water-bath, the tube is let cool. The liquid is then mixed with a sufficiency of potassium iodide, so that the iodine set free may redissolve, and titrated with hyposulphite until the color passes from a dirty yellow to a yellowish green. Starch paste is then added, and the titration is continued until the dark-violet color disappears. The liquid does not become colorless, as it is colored a turquoise blue by chrome alum, which, however, does not interfere with the sharpness of the reaction. The author uses a solution of bichromate containing exactly 5 Gm. per liter (in some cases also a 1-per-cent solution), a sulphuric acid of 25 per cent (in some cases 10 per cent), a 10-per-cent potassium iodide solution, and a 2-per-cent solution of starch which has been boiled and filtered. The solutions of alcohol taken for examination are of about 0.5 per cent. To 10 C.c. of such dilute alcohol there are used about 50 C.c. of the 0.5 per cent solution of bichromate and 10 C.c. of the 25-per-cent sulphuric acid.—*Chem. News*, March 7th (*Extract*).

Preparation of Aloin.—The aloes are exhausted with amyl alcohol at the temperature of a water-bath, when most of the resinous matters remain in the residue. The liquid is filtered and evaporated, and the aloin is obtained as a crystalline mass, contaminated, however, with a small deposit of resinous matters. This product is then exhausted with cold water, the solution is filtered, and the filtrate allowed to evaporate spontaneously, when the crystals are obtained quite pure.—*T. WOODRUFF, Pharm. Journ.*

The Scarcity of Japanese Camphor.

The following particulars regarding the preparation of Japanese camphor are furnished to the *Chemist and Druggist* by a firm of exporters of Japanese products at Hiogo:

The camphor forests in southern Japan are divided into two categories, which furnish the bulk of the world's camphor supplies.

In the first category are the forests which are the property of the Government and kept under the strict supervision of the forest department. They contain a considerable number of trees, but as far as the supply of camphor is concerned these forests can only be counted upon to a limited extent. At the discretion of the authorities permits are given at irregular intervals to cut down old trees in certain districts, and the production of the Government forests depends on the relative liberality with which permits are issued. On the average the Government forests furnish about one-fifth of the total quantity exported, and cannot be depended on as a regular source of supplies. On the other hand, the forests or trees belonging to private individuals are the base of the supply of the trade. That a considerable decrease of the camphor trees has taken place is beyond doubt. The provinces of Tosa and Satsuma, in former years the only sources of supply, are very nearly exhausted; but in distant parts, beyond the mountains and remote from water, camphor trees are still to be found. This is of importance, as the present high price of camphor on the spot is further enhanced by transportation through pathless regions before water, wanted for the distillation of the gum, can be reached.

The production has, under these circumstances, and in spite of the abnormally high prices now ruling, not experienced any material increase. At the same time it must be stated that there is now proceeding an extension of the distilling area over new districts—i. e., in provinces comparatively bare of trees, and which up to now gave no camphor. These facts confirm the view that, however high prices may go, the average supplies will not only not experience any essential increase, but, on the contrary, become less and less in future years.

The camphor tree, like the oak, grows very slowly, and it takes several hundred years before the full size has been obtained; there is, therefore, no chance for the present generation to derive any benefit from the trees now in course of being planted. The present prices stimulate the production to the utmost, and the fresh gum is being hurried upon the market. The opinion that native speculators store the camphor in order to raise prices is totally wrong.

The largest yield of gum from the trees is obtained during the cold seasons; firstly, on account of the sap or essential oil contained in the tree then being concentrated in the big roots and the lower part of the stem, and, secondly, as the distillation can be done more efficiently by using cold water. This process is performed in a most primitive way on the banks of the nearest brook, as follows:

A hearth or circular wall of stone is constructed, 5 to 7 feet high; on this is placed an iron pan, and thereupon a tub about 3 feet high, the perforated bottom of which rests on the pan. Then the tub is wrapped up in a layer of clay, into which the roots and stem wood, cut into small chips, are placed. Water is now poured into the pan, the cover of the tub closed air-tight by clay, and fire kindled on the hearth. The steam rising from the pan pervades the chips and extracts from them the essential oil, leading it through a bamboo tube into the refrigerator, which consists of two wooden boxes, through the larger one of which, having no cover, a continuous stream of water is flowing, while the smaller one, being without a bottom, is placed on the water in the larger box, and serves as an air-tight receptacle for the steam saturated with the essential oil, which after the lapse of twelve hours is thoroughly extracted from the chips. In the meanwhile camphor and camphor oil have deposited on the inside of the smaller box above the water; they are scraped off, and, by pressing them, the camphor crystals and oil are separated. The camphor thus obtained is in a very wet condition, and loses up to 30 per cent more of oil and water until it is put on board a vessel. The camphor oil is valuable, and carefully collected to be refined, thus yielding more camphor, while the refined oil is sold for exportation as camphor oil.

Hiogo is by far the most important place in Japan for the exportation of camphor, but the gum is extensively dealt in at Nagasaki also, chiefly for the wants of Hong Kong. There are no available returns for this latter port, and it is probable that its trade is gradually being more or less absorbed by Hiogo. The apparent scarcity of camphor in Satsuma and the southern provinces generally accounts for this fact, while the distilling area has extended further north—i. e., into closer proximity to Hiogo. It should also be borne in mind that the camphor which is now shipped loses about 5 per cent more weight during the voyage than formerly, when the cargo was delivered by the natives in a drier condition.

Diuretin.

UNDER the name "diuretin," a sodio-salicylic compound of theobromine, corresponding to one of the so-called soluble salts of caffeine, has been introduced as an advantageous diuretic (*Apoth.-Zeit.*, December 14th, page 1338). According to Dr. Gram, of Copenhagen, theobromine is a diuretic, acting directly upon the kidneys, differing from caffeine in not affecting the central nervous system, and therefore not causing sleeplessness and restlessness. It is said to have produced satisfactory diuresis in cases of renal and heart disease in which digitalis and strophanthus have been without effect. But as the free alkaloid requires about 1,600 parts of water for its solution, it is not readily absorbed, and gives rise to disturbance of the stomach. Diuretin, on the other hand, is alleged to produce the beneficial effects of theobromine without the unpleasant symptoms. It is described as occurring as a white powder containing 50 per cent of theobromine, dissolving, with the aid of heat, in less than half its weight of water, and remaining in solution after the liquid has cooled. It is administered to the extent of about 6 Gm. daily in 1-Gm. doses.—*Pharm. Journ.*

Hints for Pharmacists.

At a meeting of the Glasgow Chemists' and Druggists' Assistants' Association, on February 19th, Mr. A. McKellar read a paper entitled "Useful Hints," the principal points of which are given in the subjoined abstract. The author said he could not claim originality for the observations set down in the paper, but it had occurred to him that some of the practical lessons learned, in a varied and sometimes painful, but, in the main, wholesome experience, might be of some little value to others at their daily work. Perhaps nothing occasioned more difficulty and vexation to the beginner in pharmacy than the apparently simple operation of

Cleaning Measures, etc. Therefore he would venture to make some suggestions in that connection. His list of detergents was not exhaustive, but he could answer for its trustworthiness.

Character of stain, etc.	Solvent.
Aniline dyes, e.g., fuchsine, marking-ink, etc.	Sol. Acid. Tart.
Deposits in bottles from fluid magnesia, Farrish's syrup, Easton's syrup, Opium and cinchona preparations, Tr. benzoin co., storax, and most vegetable mixtures	..... Acid. Hydrochlor.
Tar, copaiba, tr. cannabis indica	Liq. Potassae.
Old paint and grease stains on clothes	Turpentine.
	Chloroform.

For cleaning greasy ointment slabs nothing is equal to methylated spirit on cotton, followed by thorough washing with soap and water. The opaque film that occasionally forms in the water bottle, being chiefly of an organic nature, is at once removed by sulphuric acid, which also—diluted—instantaneously dissolves off the dirty scum so often found on opal pots, the process being attended by a very palpable evolution of H₂S. Two of the dirtiest bottles in every shop are those for Liquor Plumbi Subacet. and Tr. Ferri Chloridi. For the former strong acetic acid is recommended, but iodide of potassium, in small quantity, forming iodide of lead, and subsequent rinsing out with ammonia [solution of chloride of ammonium?—Ed.], answers admirably; while for the latter, although hydrochloric acid helps, nothing but hard rubbing makes a good job. The dark stain left in a mortar in which Ethiops mineral has been made is only partially erased by hydrochloric acid, but a liberal application of elbow-grease and a piece of pumice-stone are needed to complete the renovation. The dimness observed in old liquor-potassae bottles, being due, as was explained in the last Pharmaceutical Conference, to the chemical action of the alkali on the glass, is not removable. Greasy ointment pots are best treated with dry sawdust; and bone tallies, ink-stained and yellow, are converted into blanchéd blanks with the aid of dilute hydrochloric acid. For

Taking off Soiled Labels from customers' bottles—always a crucial test of a druggist's taste and conscientiousness in details—the most expeditious and effective plan is first to wet the label thoroughly, and then cautiously hold the bottle over a gas flame, when, as a rule, the label will peel off. In some high-class pharmacies a steam jet is used for this purpose, but the humbler method is quite as successful. Labels on liniment bottles, etc., are often so soaked with oil that when a repeat is wanted the prescription-book number is undecipherable; in that event, rub label lightly with piece of cotton, then moisten with benzoin and dry above a gas flame, when in nine cases out of ten the figures will become legible. These exhaust most of the commoner stains, and it only remains to add a few odds and ends.

A *Good Desiccator* for pills, soft leaves, etc., can be devised by taking a Pears' soap box, laying a few pieces of quicklime on the bottom, and resting a jujube tin, holding the substances to be dried, on the quicklime bed, the lid of the box being, of course, shut. Quicklime is likewise of great service in preserving books stored in a damp place, several small lumps, occasionally renewed, in a book-case being an infallible protection to the books. For enamelled

goods use Brooks' soap; and, finally, if your apron string breaks off at an inopportune moment, take any button-shaped lozenge, wrap it in the corner of the apron, and tie the tape round it. This is a splendid makeshift, and gives the washerwoman a little innocent amusement picking out the knot to discover what the knob contains.—*Chem. and Drugg.*

Artificial Musk.

FROM an editorial entitled "Synthetic Musk," in the *Chem. and Drugg.* of February 1st, which has evidently been contributed by a person specially posted on this subject, we take the following:

The fact that an essential-oil grower and practical perfumer of repute, and a firm who are already able to point to the successful introduction of a product probably closely allied to the synthetic musk, have sufficient faith in the latter article to identify themselves with it, is certainly *prima-facie* evidence that the newcomer is destined to create some stir in the future. We have secured a sample of the new compound, part of which we have submitted to certain experiments, while we have distributed a portion to a few wholesale perfumers, with the request that they should put its efficiency to a practical test. The new product appears in minute, glistening white crystals. Its odor (which the inventors claim to surpass that of true musk in intensity several times) is remarkably powerful and durable, but it is not exactly that of true Tonquin musk—certainly no perfumer would confound the two. When smelled faintly, however, it is of a character decidedly akin to musk, and to the general public the two would probably be the same. We need not say that the new product is a coal-tar derivative, obtained from toluol as the starting point, though by what precise process is, of course, only known to the manufacturers. Our experiments point to the probability that the article is a member of the class of aromatic bodies of which vanillin and saccharin are typical samples. The sample which we tested dissolved readily in rectified spirit. A 1-per-cent alcoholic solution is not in itself of a musky odor, but upon diluting this solution with water the musk odor develops strongly, and remains distinctly perceptible up to 1 in 50,000. Solutions ranging in strength from 1 in 100,000 up to 1 in 720,000 still have a perceptible odor; but in these weak solutions it is not possible to say for certain that the odor is that of musk. The 1-per-cent alcoholic solution diluted with water to 1 in 2,000 is opalescent, but when further diluted to 1 in 36,000 it gradually becomes clear, and the musky odor appears to gain in intensity up to this point.

Upon diluting a 1-per-cent alcoholic solution with water to 1 in 3,000, and adding caustic soda to four times the weight of the "musk," the appearance of the solution remained unchanged, i.e., opalescent. But after boiling the opalescence disappeared, and, in contrast with the non-alkaline solution, the musk odor became much more intense, and appeared to gain in the course of thirty-six hours. Similar treatment with sulphuric acid resulted in the precipitation of the "musk" in the form of needle-shaped crystals, about one-eighth inch long. This solution possessed only a very feeble musk odor, due, no doubt, to the fact that the odoriferous body had crystallized out. The alcoholic solution was neutral to test paper. A drop of it placed on blue litmus paper left no stain when the alcohol was dispelled by heat, but upon exposure to the air for a few hours a faint red spot appeared. It is probable that the body is of the nature of an acid, but although our observations point to this conclusion, they are not sufficiently definite. Mixed with a solution of attar of rose in the proportion of 10 of attar and 1 of musk, and diluted with water, the rose odor predominated at first, but when more water was added the musk began to develop distinctly.

The behavior of the new product with caustic soda would seem to indicate that it could be used as an ingredient in the manufacture of toilet soaps without destruction of the odor of the alkali. Of course, the crowning test of the value of the article can only be obtained by time, and as the musk has only been obtainable for a few weeks the wholesale druggists and perfumers who are now experimenting with it cannot yet give a definite opinion as to its merits, though in one or two English quarters we have heard views expressed which are the reverse of favorable—one of our informants assuring us that the alcoholic solution turns acid, which, if correct, would prove an insuperable obstacle to its use in perfumery.

It is among Parisian perfumers and druggists, however, that the article has been subject to the most thorough experiments so far, and inquiries in that city broadly show that the perfumers are not dissatisfied with the present results of their tests, though they speak in guarded terms, and are careful to point out that time only can show whether the perfume possesses the supreme qualification of permanency. On the other hand, the wholesale druggists generally refer to the compound in terms of some disparagement, and, at any rate, have very little to say in its favor, while the importers of musk profess themselves confident that the new product will not sensibly affect the price or the consumption of the better grades of the natural article, though they admit that for some weeks their trade has been at a standstill. The manufacturers of

the article and their selling agents are very unwilling to give any information of any value, and appear to think that for the present their best policy is one of mysteriousness, if not of mystification. The wholesale price of the new product is at present from 2,500f. to 3,000f. per kilo, or from 60s. to 70s. per oz., which is rather more than half the price of the finest Tonquin grain musk. One of the French perfumers assures us that he has found the artificial article to be about 25 per cent cheaper in use than natural musk, which would scarcely bear out the claim of the manufacturers that their product is more powerful than natural musk.

Notes on Lanolin.

H. HELBIG, F.C.S., lately Apotheker of the German Hospital, London, writes to the *Chemist and Druggist*:

Since my first note on "The Place of Lanolin in Pharmacy" appeared, experiments of the value of lanolin as an ointment base have been continually proceeding, with the result that several new directions for its application have come to light. I now purpose to call attention to these novel features by collecting them together into a single article, the more confidently as I am convinced that the general use of lanolin as an ointment base is only a question of time, and of how short a time may be judged by the number of opinions on the subject which daily find expression.

Popularly also the substance is widely used in the preparation of domestic remedies, and it is largely selected as a vehicle for the application of any agent the rapid absorption of which it is desired to insure; in evidence of which the use of lanolin for preparations of pine, creolin, etc., may be instanced.

Quite a household remedy in Germany, but, so far as my experience goes, not yet recognized in this country, is the ointment made according to the following formula:

Camphor..... gr. xx.
Lanolin ointment base..... 3 i

Mix.

This preparation is put up by many chemists as an infallible chilblain remedy, while at the same time it proves a very useful application for the slight burns of common occurrence in daily life.

Another popular formula is:

Menthol..... gr. x.
Cocaine..... gr. v.
Lanolin ointment base..... 3 i.

Mix.

In Germany it is now quite fashionable to use combinations containing menthol as snuff for catarrh. The ointment made according to the above formula is used for the same affection, and the rapidity with which it produces alleviation when applied to the nose is described as marvellous.

Another new development in the use of lanolin consists in adding it to powders designed for toilet use. It is not surprising that such powders, particularly when intended for use in the nursery or for the complexion, are much improved by the addition of the natural skin fat, which increases the smoothness and suppleness of the surface to which they are applied. From 3 to 5 per cent of anhydrous lanolin can be easily mixed with any composition of the kind named by simply rubbing together. Although the admixture is facilitated by the previous solution of the lanolin, say, in ether, such a *modus procedendi* is not essential to success.

Quite recently the introduction of lanolin into Hebra's ointment has been also recommended, not only as a means of increasing its remedial virtues, but also because the process of manufacture, always troublesome to the pharmacist, is somewhat simplified. Dr. Goldman, in a lengthy paper in the *Therapeut. Monatsch.* on the subject, suggests the substitution of lanolin for the olive oil in the ointment, by which, he says, it will produce quite an equal product. His formula is as follows:

Oleate of Lead, freshly precipitated and pressed, 100 parts
Liquid Paraffin..... 15 1/4 "

Melt together on a water-bath in a porcelain dish and stir till cold.

Of this diluted lead oleate, 60 parts mixed with 40 parts of lanolin give a yellowish-white stable ointment. For the preparation of the lead oleate, the author gives the following directions:

Acetate of Lead..... 100 parts
Boiling Distilled Water..... 600 "

Dissolve, filter, and mix with a warm filtered solution of

Castile Soap..... 150 parts in
Distilled Water..... 750 "

The excess of lead solution and water are removed by powerful pressure, the mass being once washed with warm water and pressed again.

On the Solubility of some Alkaloids and their Salts in Pure Ether.

K. TAMBA has made experiments, in Prof. Hilger's laboratory, to determine the rate of solubility of certain alkaloids and alkaloidal salts in chemically pure ether, cold and boiling, and also when exposed for some time to ether vapor or boiling ether. The ether used in these experiments had first been treated with metallic sodium, and was then repeatedly rectified from caustic lime and anhydrous sulphate of copper.

[Note by Ed. Am. Drugg.—In our judgment an additional series of experiments with an ether, not absolutely anhydrous, but of the kind and quality known as "stronger ether," would have been of special interest, as this kind is always available and sufficiently pure as a solvent.]

The method for determining the solubilities in cold ether was as follows: 0.25 Gm. of the alkaloid or its salt was reduced to powder, rendered air-dry, put into flasks of equal size together with 15 Gm. of the ether, and allowed to macerate during twenty-four hours at 17° C., the flasks being well stoppered. At the end of twenty-four hours the solutions were passed through a weighed filter into a tared flask, and each filter washed with 2 Gm. of ether. The undissolved alkaloid was thus carefully collected upon each filter. The filtrate was evaporated at a gentle heat, the flask then put for one hour into an exsiccator containing sulphuric acid, and weighed. The filter was also dried and weighed.

To determine the solubility in boiling ether, the alkaloids were heated in flasks provided with upright condensers, with ether kept boiling during five minutes.

Finally a series of experiments were made to ascertain how much of each alkaloid and salt would be dissolved if it were subjected to continuous extraction in a Soxhlet apparatus during forty minutes—20 C.c. of ether being used.

The results obtained were as follows (no experiments were made in the cases where no figures are given):

ALKALOIDS AND SALTS.	QUANTITY SOLUBLE IN 100 PARTS OF PURE ETHER		
	at 15° C.	at boil. point, 5 minutes.	by extraction 40 min.
Atropine Sulphate.....	0.007	0.0188	0.065
Brucine.....	0.5033	0.480	0.765
Colchicine.....	0.510	.....	.....
Morphine.....	0.025	0.057	0.130
Morphine Sulphate.....	0.033	0.007	0.075
Narceine.....	0.0083	.....	.....
Narcotine.....	0.887	0.680	2.545
Strychnine.....	0.0232	0.057	0.305
Strychnine Nitrate.....	0.0013	0.0138	0.055
Thebaine.....	0.5233	.....	.....
Veratrine.....	1.527	.....	.....

—After A. Hilger, *Mittheilungen pharm. Inst. Erlangen*, ii., 283.

Soluble Essence of Ginger.

SOME three years ago my attention was directed to this essence, and I commenced operations by an examination of the various soluble essences of ginger put forward by numerous makers, and although satisfied that there were some good individual points in most of the samples examined, yet there were but two which could be said to bear any approach to my idea of what a really good soluble essence of ginger ought to be.

At the outset, I therefore laid down what I considered should be the governing points of my work:

1. That the "essence" should be as strong as possible compatible with solubility.
2. That it should possess the fine aroma peculiar to Jamaica ginger.
3. That it should be perfectly free from capsicum. And now, after a long series of experiments, extending over a period of two years, I have at last succeeded in producing from the following formula a soluble essence of ginger quite equal to anything at present on the market:

Working Formula.

	(Brit. weights and meas.)
Ginger, in coarse powder.....	1 lb. 8 oz.
Alcohol (60 per cent).....	2 pints 5 oz.
Water.....	15 oz.
	3 pints.

Shake them frequently together for ten days, then percolate, press off, and filter, obtaining 45 fluidounces. This is "not to be made up" to 60 fluidounces, but worked from as it stands.

Take of the above tincture 40 fluidounces, water 40 fluidounces, and mix; dissolve three-fourths of an ounce of phosphate of sodium in 5 ounces of boiling water, allow to cool, and then add it, shaking the mixture; next dis-

solve one-fourth of an ounce of fused chloride of calcium in 5 ounces of nearly cold water, and add the whole to be again well shaken; allow to stand twelve hours, and filter.

Introduce the filtered solution into a still and distil off, at a very low temperature, 30 fluidounces, which put on one side in a bottle for further use.

Distil then a further quantity of 40 fluidounces, and allow the still to cool.

The residue in the still, which will be about 18 fluidounces, is what we require. This must now be carefully got out by rinsing the still with the 30 fluidounces first drawn over. This takes up all that is essential. Filter once more through a double-paper filter, and the product is 40 fluidounces of a fine amber-colored essence almost entirely soluble in water.

I trust the above will be found acceptable as a step towards elucidating that which hitherto seems to have been shrouded in a sort of mystery.—W. H. McGRATH in *Chem. and Drugg.*

[Note by Ed. Am. Drugg.—The author has probably not had occasion to refer to the National Formulary, which contains a formula under No. 242, "Liquor Zingiberis" (Solution of Ginger, Soluble Essence of Ginger), which is mainly based on the process proposed by Mr. L. T. Stevens, of Brooklyn. See this journal, 1886, page 188.]

Orexine—A Synthetic Appetizer.

ANOTHER new member has been added to the steadily growing list of remedies for the diseases which afflict man, and ere long we shall probably have, as the *Pharmazeutische Zeitung* hints, a remedy for every condition of illness. The latest comer is, fortunately, not an antipyretic, but an appetizer. It is the hydrochloride of phenyldihydrochinazolin, and, "for short," will be known as orexine, which literally means appetizer, the name being derived from the Greek. The constitution of the body is represented by the formula



This base occurs in glistening needles, which contain two molecules of water of crystallization. It is insoluble in water, but its hydrochloride readily dissolves. The remedy is given in pill form, thus:

Orexine Hydrochloride 30 grains.
 Extract of Gentian.
 Powdered Althaea Root, of each sufficient to make a mass, which is to be divided into 20 pills.
 Coat with Gelatin.

Three to five of these pills are to be given once or twice a day with a large cupful of beef tea. The contemporary from whom we quote rather ironically remarks that gentian extract and beef tea are themselves good and powerful stimulants of the appetite, and leaves us somewhat in doubt as to whether the good results of orexine are due to it or to its vehicles.—*Chem. and Drugg.*

Phenylurethane.

PHENYLURETHANE is the name given to a new compound that has been commended for its antipyretic, antirheumatic, and analgesic properties by Prof. Giacomini in the Turin Academy of Medicine (*Pharm. Zeit.*, December 4th, page 740). It is represented as being a compound belonging to the aromatic group, resulting from the combination of aniline with chlorocarbonic ethyl ether, and occurring as a white crystalline powder, insoluble in water, and freely soluble in concentrated alcohol. Phenylurethane is claimed to act as an energetic and certain antipyretic, while at the same time exercising a beneficial influence on the general system. A dose of 0.5 Gm. is said to be equal to 1 Gm. of antipyrine, and to be sufficient to produce a fall in the temperature of from one to three degrees Celsius, lasting from nine to twelve hours. In acute and chronic articular rheumatism, it is said to relieve the pain and reduce the swelling in the joints, for which purpose it is given in doses of 0.5 Gm. As an analgesic, it produces in some cases a favorable result, whilst in others the result is negative. The form recommended for its administration is as a solution in Marsala wine, which is said to prevent collapse, cyanosis, and other unpleasant symptoms.—*Pharm. Journ.*

Menthol as an Antiseptic and Anodyne.—The use of menthol as an antiseptic as well as an anodyne appears to be increasing, and from the fact that it is probably the least injurious of all known antiseptics, it is likely to come still more into use as such. Menthol has also been used in the vomiting of pregnancy, with success. In the *Therapeutische Monatshefte* Dr. Weiss states that he gave it to a patient who for three weeks had vomited soon after taking every meal, and that the patient was not again sick. He gave a teaspoonful hourly of a mixture of 15 grains of menthol, 6 drachms of rectified spirit, and 1 ounce of syrup.—*Pharm. Journ.*

Liquid Soaps.

In a paper read before the recent congress of Russian Pharmaceutical Societies, Mr. Saidemann called attention to the therapeutic value of liquid soaps, which he claimed to present the advantages of being more suitable for inunction, favoring admixture of medicinal substances, and being always producible from vegetable oils, thus avoiding the use of animal fats (*Pharm. Zeit. Russl.*, December 24th, page 820). The formula recommended by him for a liquid soap is to mix 1 part of caustic potassa, dissolved in an equal weight of water, with 4 parts of olive oil and one-fourth part of alcohol, and to shake it vigorously during ten minutes. The mixture is repeatedly stirred during the next hour, then mixed with an equal quantity of water, and, after standing several days, filtered. The author states that carbolic acid incorporated with a potash soap has its caustic and poisonous properties neutralized, whilst its disinfectant action appears to be increased. It is also stated that the Berlin District Sanitary Commission has found a solution of potash soap in 10,000 parts of water completely to prevent the development of the splenic fever bacillus, and has recommended a solution of 15 parts in 10,000 as one of the best disinfectants.—*Pharm. J.*

Exalgin, Phenacetin, and Antifebrin.

ACCORDING to Hirschsohn, exalgin is readily distinguishable from phenacetin and antifebrin by treatment of 1 Gm. with 2 C.c. of chloroform, which dissolves the exalgin completely, but leaves the other two undissolved (*Pharm. Zeit. Russl.*, January 14th, page 17). Antifebrin in aqueous solution gives, with bromine water, a bromine compound, differing therein from exalgin and phenacetin. Further, chloroform solution of exalgin with 10 volumes of petroleum ether forms a clear mixture, whilst a solution of phenacetin or antifebrin is turbid under the same condition. Hirschsohn says that this method allows of the detection of an admixture of 20 per cent of acetanilid, or 10 per cent of phenacetin, with exalgin.

It has already been pointed out (*Pharm. Journ.*, xix., 861; *AMER. DRUGG.*, 1889, 102) that antipyrin increases the solubility of quinine, and it is now stated that it exercises a similar influence upon caffeine (*Répertoire*, February 10th, page 5). M. Crinon reports that it suffices to add to caffeine a slightly superior weight of antipyrin to render it soluble in the cold, and that if heat be employed 0.5 Gm. of caffeine may be made to dissolve in 10 C.c. of water if 0.75 Gm. of antipyrin be added, the solution remaining clear on cooling.—After *Pharm. Journ.*

A New Method of Estimating Sugar in Urine.

JEAN POLITIS proposes the following new method in *Journ. de Pharm. et de Chim.*:

I. Copper Solution ($\frac{1}{10}$ normal):

Copper Sulph., cryst.....	24.95 Gm.
Tartrate of Potass. and Sod.	140 "
Soda, caust.....	25 "
Distilled Water.....	to make 1,000 C.c.

II. Solution of Sodium Hyposulphite ($\frac{1}{10}$ normal):

Sodium Hyposulphite.....	24.8 Gm.
Distilled Water.....	to make 1,000 C.c.

III. Iodine Solution ($\frac{1}{10}$ normal):

Iodine.....	12.7 Gm.
Iodide Potassium.....	18 "
Distilled Water.....	to make 1,000 C.c.

This solution is used to establish the titer of the "Hypo." solution.

[To execute the test, the urine should be so diluted that it contains about one-tenth per cent of sugar. A preliminary trial will enable the operator to approximate this pretty closely.]

Fifty C.c. of the alkaline copper solution are heated in a porcelain capsule to boiling, next 10 C.c. of the sugar solution or urine (containing about one-tenth per cent of sugar) are added, the whole boiled for five minutes, then diluted with water to 100 C.c., and 50 C.c. of it filtered off.

The filtrate is slightly acidulated, a little excess of iodide of potassium added, and the iodine set free by the copper which had not been reduced determined by means of the one-tenth normal hyposulphite solution. The number of cubic centimeters of the latter used, deducted from 25, indicate the quantity which had been reduced by the 5 C.c. of sugar solution or urine (contained in the 50 C.c. of the filtrate).

[In most cases the urine may be diluted with 4 parts of water.]

The following example will show how the calculation is to be made:

Supposing the 50 C.c. of filtrate, obtained as above directed, had required—after the addition of iodide of potassium—11 C.c. of the hyposulphite solution to combine with the free iodine, this would be equivalent to 14 [25—11] C.c. of copper solution which had been reduced by

the 50 C.c. of filtrate. Assuming the latter to contain 5 C.c. of diluted urine (1 in 5), then

1 C.c. of urine reduced 14 C.c. of the copper solution

1 C.c. of the copper solution = 0.0036 glucose

$0.0036 \times 14 = 0.0504$; therefore

1 C.c. of urine contains 0.0504 glucose

100 C.c. " " contain 5.04 "

PLATINUM APPARATUS FOR THE ANALYSIS OF EXTRACT OF MEAT AND ALLIED SUBSTANCES.

MR. H. N. WARREN makes the following communication on "An accurate and speedy method of examining meat extracts and other substances of an allied nature by means of the new platinum extraction apparatus" to the *Chem. News* (January 10th):

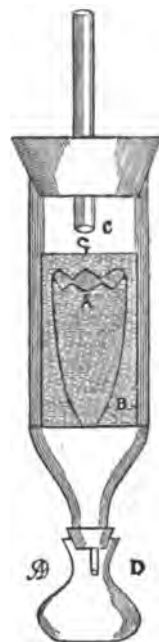
The various meat extracts of commerce all depend more or less, as far as their dietetic value is concerned, on what is known as the percentage of soluble extract; or, in more technical terms, the relative amount of extract soluble in alcohol of 80 per cent. In order to accomplish this, it is requisite to dry the sample to a constant weight, either by the aid of a water-bath or hot-air sterilizer maintained at the desired temperature. To now extract the dried residue by means of alcohol, and thus obtain a general estimate of its solubility, is void of any difficulty; but to arrive at a true percentage present, an entirely new feature, inasmuch that so obstinate are the gumming or solidifying properties of the remaining portion that any ordinary process—such, for instance, as the employment of a Soxhlet's tube or any form of apparatus where a limited supply of alcohol only is obtainable—remains perfectly inadequate.

The following form of apparatus, which is illustrated by the accompanying diagram, and which I am about briefly to describe, invariably results in the formation of a larger percentage of soluble extract than the various ether extractors with which I have compared it, both on account of the large bulk of alcohol that is continuously brought to play upon the enclosed residue, and at the same time retaining a much higher temperature, and, by so doing, perform the operation in less than half the usual time. A brief summary will suffice to explain the construction of the same. A is a tared paper which has been previously treated with alcohol. Into this is placed the dried extract, to which has been added a small quantity of carefully prepared and weighed sand, and the whole introduced into the platinum cage B, which is readily contrived by coiling in a spiral manner a piece of platinum gauze, turning inward the lower extremities in order to form a bottom, and furnishing the same with a cap surmounted by a small hook, while the whole is maintained in position by surrounding the same by means of the glass tube C, and in direct connection with the flask D, and containing the requisite amount of alcohol; the entire apparatus being connected by the usual method to a Liebig's condenser, whence a rapid and effectual distillation is readily accomplished—the platinum cage thus acting twofold, both by retaining any paper that may become mechanically detached by means of the alcohol, and at the same time preventing the paper from becoming attached to the sides of the outer or retaining tube, and, by so doing, retarding the influx of the alcohol. In cases where the weight of the residue is required, it forms a most effective and simple arrangement, being readily detached from the glass tube when required, and admitting of being readily weighed by suspending it from the beam of a balance by means of the small hook at the summit. In certain instances where the inorganic portion is required, it may be readily ignited without detaching the residue, and the amount estimated.

In the performance of milk analysis a rapid and accurate determination may be made as follows, a sufficiency of the sample having been evaporated in a platinum dish to a convenient bulk. A known quantity of sand, which has been thoroughly purified and tared, is placed in a paper or fine linen filter, and the milk poured into the same, the sand at once retaining, without risk of loss, the whole of the evaporated sample, which, after drying to a constant weight and deducting superfluous substances, gives the total percentage of solids; or it may be divided into two portions, using the residue for extraction of fat only, relying upon a second portion for estimation of solids.

With reference to sand, I may also state that I have frequently used with success prepared sponge as an absorbing agent.

[The author appends some analytical data which prove his method to be accurate and satisfactory.]



Quantitative Determination of Citric Acid in Plants.

MR. EDO CLAASSEN, of Cleveland, Ohio, communicates a paper on the quantitative determination of citric acid in the leaves of *Cephalanthus occidentalis* L., and in plants generally, to the *Pharmac. Rundschau* (1889, 59). From this we translate the author's general method:

Exhaust the respective plant or part of the plant with water containing ammonia and carbonate of ammonium, concentrate the liquid somewhat, precipitate with acetate of lead, dry the precipitate and boil it with strong alcohol. Then diffuse the precipitate in water, decompose it with hydrosulphuric acid, filter, wash, and evaporate filtrate and washings to a thin syrup. To this add chloride of ammonium, an excess of ammonia, then calcium chloride and 3 volumes of alcohol. Wash the precipitate thereby produced with a mixture of 3 parts of alcohol and 1 part of water, dry the precipitate to dissipate the retained alcohol, and dissolve it in hot, very dilute hydrochloric acid. Allow to cool, filter, and evaporate the filtrate completely to dryness. Redissolve it with boiling water containing ammonia, filter at once through a tared filter, and wash with hot water. Again evaporate the filtrate and proceed as just mentioned, in order to obtain a further small portion of the substance, if possible. In case the calcium citrate which remains on the filter (or filters) is not sufficiently pure, dissolve it in the necessary quantity of hot and very dilute hydrochloric acid, allow the liquid to become cold (and filter again, if necessary), add ammonia in excess, filter again, evaporate the filtrate to dryness, and proceed as before directed.

The Action of Hydrocyanic Acid upon Calomel.

THE gray color caused by the action of hydrocyanic acid on calomel has long been known. Scheel gives the reaction: $2\text{HgCl}_2 + 2\text{HCN} = \text{Hg} + \text{Hg}(\text{CN})_2 + 2\text{HCl}$. Bussy and Buiquet treated 1 Gm. of calomel repeatedly with hydrocyanic acid (1:10), and obtained 0.42 Gm. of mercury and 0.56 Gm. of mercuric chloride, and concluded that the hydrocyanic acid simply decomposed the calomel into mercury and mercuric chloride. As, however, this ran counter to thermo-chemical considerations, Mr. Fouquet repeated their experiments and obtained the same quantity of mercury left, but on examining the filtrate found it was not a solution of mercuric chloride mixed with hydrocyanic acid, but one of mercuric cyanide in hydrochloric acid, for it was strongly acid in reaction, gave no precipitate with potassa, and, if first neutralized, none with potassium bromide. On evaporating, mercuric chloride was certainly left, due to the expulsion of hydrocyanic acid by hydrochloric acid as concentration proceeded. It therefore appears that the reaction occurs in the manner indicated by Scheel; but it is never complete by a single treatment with hydrocyanic acid, for it ceases directly the proportion of hydrochloric acid present rises to a certain limit. It can be aided by neutralizing the acid as it forms, and hindered by the addition of an initial dose of acid. Pharmaceutical preparations containing hydrocyanic acid and calomel, though apt to become discolored from this reaction, are not more dangerous on account of the mercuric cyanide formed than they are from the corresponding quantity of hydrocyanic acid originally present.—*J. Pharm. et Chim.* and *J. Soc. Chem. Ind.*

Comparative Results in the Analysis of Fats.

MR. RUSSEL W. MOORE has had occasion to employ extensively the modification of the Reichert process for the determination of fats, proposed by Prof. Waller, and has made comparative trials with the Hehner or wash process. He writes of these, and of their combination, in a paper laid before the Amer. Chem. Soc. as follows (*Journ. Am. Chem. Soc.*, xi., 144):

The modification, or rather extension, of the Reichert process is conducted as follows: The Reichert process is strictly followed out; 2.5 Gm. of fat are saponified with 1 Gm. of caustic potassa and 50 C.c. of 70-per-cent alcohol. The alcohol, after the saponification is complete, is entirely driven off, the last portions being removed by a current of air, and the resulting soap is dissolved, with the aid of heat, in 50 C.c. of water, and decomposed with 20 C.c. of dilute sulphuric acid (1:10).

The flask is now attached to a condenser, preferably of the well-known upright glass worm carrying furnished with a bulb tube to prevent mechanical carrying over of the acid, and exactly 50 C.c. are distilled and titrated with decinormal soda solution. The Reichert figure is thus obtained, and a certain portion of the volatile fatty acid has been removed. Fifty C.c. of water are added to the contents of the flask, the distillation is repeated, and the distillate titrated, and this same course is continued until a practically neutral distillate of 50 C.c. is obtained, that is, one requiring one-tenth of 1 C.c. of decinormal soda, or less, for neutralization. The total amount of acidity of all the distillates is now calculated as butyric acid, and the total per cent of volatile fatty acid is thus obtained.

The insoluble acids now remain in the flask and the bulb tube, or adhere to the sides of the condenser or filter used to filter the distillate. The portion in the bulb tube and condenser is rinsed into a small flask with a little hot alcohol, and that in the flask is allowed to become solid. The liquid underneath, containing sulphuric acid, potas-

sium sulphate, and glycerin, is poured off through the filter that received the original distillate. The fatty acids are then treated with hot water several times, allowing them to cool into a cake before pouring the wash water through the filter. When the wash water shows no reaction for sulphuric acid the washing is complete. Three washings of about 100 C.c. each usually suffice for this purpose. The rinsings of the condenser are now added to the insoluble fatty acids, the filter is exhausted with hot alcohol to remove adhering fatty acid, the alcohol is expelled, and the contents of the flask are dried to constant or slightly increasing weight at 105° C. The per cent of insoluble fatty acids can then be calculated.

Bumping during distillation can be avoided by using spirals of coarse platinum wire; these can be weighed with the flask, and require no further attention.

A blank test of the reagents used should also be made, and any acidity yielded by them in the distillate allowed for.

The method conducted as above furnishes:

1. The Reichert figure.
2. The soluble fatty acids.
3. The insoluble fatty acids.

The advantages claimed for this method are as follows:

1. A combination of the two most valuable and reliable methods, the Reichert and the elaborated Hehner, into one.
2. Greater ease and rapidity of manipulation than the Dupré method.

3. Avoidance of loss of insoluble fatty acids due to transfer of the fatty acids from the flask in which the fat was originally weighed. The filter used is a small one and can easily be exhausted with hot alcohol.

4. Necessity of only one standard solution instead of four, as in the Dupré process. The decinormal soda is a very permanent solution, and the use of alcoholic potassa, which is subject to daily and even hourly change, is avoided.

The author gives a comparative table, from which it appears that this combined method gives very good results, except in the case of coconut oil, which contains a large proportion of fatty acids soluble with difficulty in water.

College of Pharmacy of the City of New York.—The annual meeting of the College took place on March 20th, on which occasion the largest number of members that ever participated in an election of officers of the institution put in an appearance. The following gentlemen were elected:

President—S. W. Fairchild; Vice-Presidents—(1) Geo. Massey, (2) W. L. Vennard, (3) Thos. F. Main; Treasurer—H. N. Fraser; Secretary—J. N. Hegeman; Trustees to serve three years—Ewen McIntyre, Theo. Louis, Dom. Peraza, John R. Caswell, Gust. Balser; Trustees to fill unexpired term (of Emlen Painter, deceased)—Alb. A. Merritt.

After the election most of the members present availed themselves of the invitation of Mr. Kemp to partake of a collation at Delmonico's, to do honor to the newly elected officers, and to more fully cement the good feeling and spirit of harmony which have always existed among the members of the College.

The present session is the most successful in the history of the institution. The Junior class numbers 151, and the Senior 121 members. Since the decease of Prof. Schrenk, the department of pharmacognosy has been placed in charge of Prof. H. H. Rusby, who will hereafter deliver the lectures on Materia Medica, Botany, and Pharmacognosy, and will conduct the practical work in botanical and pharmacognostic investigations.

A New Iodoform Industry.—Iodoform is prepared from varec soda by Suilliot and Raynaud's process at the manufactory of S. Casthélaz, Bruère & Co., at La Poterie-de-Belbeuf, near Rouen. The alkaline iodides are extracted from the varec soda by systematic washing with cold water, or by means of steam extraction, aided by a mechanical stirring apparatus. The solution obtained is desulphurized by known methods, and filtered. The clear filtrate is mixed in a large vat, provided with stirring apparatus, with sodium hydrate, acetone, and sodium hypochlorite. The iodoform which separates is purified in the usual way. The mother-liquor from these operations is worked up, first for potassium sulphate and chloride, and then for bromine.—*Journ. Soc. Chem. Ind.*

Pilocarpine in Jaundice.—Witkowski (*Therap. Gaz.*, January, page 46) considers pilocarpine to be almost a specific in jaundice, so much so, indeed, that if, after treatment lasting from ten to sixteen days, the jaundice does not disappear, he would attribute it to malignant disease. In one patient, who had suffered for four years, one-sixth of a grain of pilocarpine, subcutaneously injected once or twice daily for three weeks, caused the disappearance of the jaundice for the three years whilst under observation. Thirty analogous cases treated in a similar manner were followed with equally satisfactory results. The only cases in which it did not succeed were when the jaundice was accompanied by a tumor in the liver. He therefore recommends its use in all cases where the condition of the heart will permit it.—*Pharm. Journ.*

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ITEMS.

Dr. George Thurber.

DR. GEORGE THURBER, one of the most accomplished botanists this country ever produced, died on Wednesday night at his home, The Beeches, Passaic, the township in which he had lived for over twenty years. Dr. Thurber, who at one time was a familiar figure in "Newspaper Row," had, on account of failing health, latterly remained in strict retirement, and at the time of his death had not visited New York for nearly three years. About five weeks ago, on his removal from his old home, The Pines, to the new building occupied by his brother-in-law, George Woolson, Dr. Thurber was seized with a severe attack of rheumatism, which developed into a complication of disorders. He never rallied, and on Tuesday began to sink rapidly, being unable to articulate for many hours preceding his death.

The dead man, whose name is a household word among botanists in every part of the country, was born in Providence, R. I., on September 2d, 1821, his father being Jacob Thurber, an old resident of that city. Having received a private school education, he was apprenticed to the drug business, and even at that early age had obtained a knowledge of botany so extensive that when, in conjunction with Joshua Chapin, he began business for himself, he was master of the history and derivation of every drug in his store.

He remained in Providence until 1850, when he formed one of the special commission appointed by the Government to settle the boundary between the United States and Mexico, and took part in several of the periodical skirmishes with the Indians. Here it was that Dr. Thurber began those researches in botany that afterward made him famous, and completed a collection that comprised every plant native to Mexican soil, the majority of which had hitherto been unknown to science.

In 1853 the commission, of which Dr. Thurber had been quartermaster, was disbanded, and he came to New York, where he received an appointment in the Assay Office. He was a strong supporter of Fremont in the Presidential campaign of 1856-'57. His openly avowed abolitionist sentiments were not at all to the taste of the ruling powers in the Assay Office, who were all devoted to the cause of Mr. Buchanan, and finally Dr. Thurber had the alternative of voting for the Democratic candidate or resigning. He chose to resign, and for some time was without employment, but rented a room in the Cooper Union, where he pursued his chemical and botanical studies.

Then, in 1859, he was appointed professor of botany and horticulture in the State Agricultural College, Lansing, Mich., and while there he revised Dr. Darlington's "American Weeds and Useful Plants." In 1863 Dr. Thur-

ber accepted the editorship of the *American Agriculturist*, and retained that place until 1885, when failing health caused his retirement. During his twenty-two years' service as editor he had sole charge of the revision and editing of all works on horticulture published by the Orange Judd Co.

In addition to the papers written by him for the *American Agriculturist* in his editorial capacity, Dr. Thurber was the author of all the articles on botany and horticulture now to be found in "Appleton's Encyclopædia," and delivered a large number of lectures on chemistry and botany at the Cooper Union and at the College of Pharmacy. In this country he was the foremost authority on grasses.

Dr. Thurber only once ventured outside America, in 1879, when he paid a brief visit to England. Since his retirement from active work he has spent most of his time in contributing occasional special papers to horticultural and botanical magazines and periodicals, the last article written by him being "The Poisonous Hairs of the *Primula Obconica*," for *Garden and Forest*. He was never married, but leaves a brother and three sisters.—*N. Y. Daily Tribune*.

Dr. Georg Kerner, whose death was lately announced, was one of the most successful of German chemists. He first selected the career of an apothecary, but when he went to the chemical laboratory of Professor Fresenius, in Wiesbaden, to widen his experience and education, the attractions of pure science were so powerful that he devoted himself entirely to the pursuit of chemistry. Having worked under Fresenius for a time, Kerner entered the quinine factory of Zimmer, in Sachsenhausen, near Frankfurt, where he soon rose to the position of technical manager. To his ability in this post the business undoubtedly owes much. When the concern was transferred to the management of a limited liability company, Kerner retired from active business life, and at the comparatively early age of 54 left forever the crucible and retort.

Professor Joseph Schrenk, of the College of Pharmacy of the City of New York, died on March 10th at his home in Hoboken, after an illness of several months' duration. He was born on December 31st, 1842, in Transylvania, studied law at the University of Vienna, and came to this country in 1865, when he entered upon an educational career, occupying first a position as teacher at the Heidenfeld Institute, New York. His abilities and executive talents were soon recognized, and he received a call as principal of the public school at College Point, which he accepted. He was also elected director of the Poppenhusen Institute at the same place. Ten years ago he was invited to accept the position as principal at the Hoboken Academy, which he occupied up to the time of his death. For many years past he had devoted all his spare time to botanical studies, and became a recognized authority in this field of science. By nature a deep thinker, a close observer of nature, and an original investigator, he made many important contributions to systematic and structural botany. In connection with his botanical studies he also took up the field of pharmacognosy, and became one of the most accomplished experts in this branch of science. In 1882 he was appointed professor of practical botany in the College of Pharmacy of the City of New York, and some years subsequently was elected professor of pharmacognosy. In connection with these departments he also conducted the instruction in microscopy, in the practical use and application of which he had but few equals. The College has lost in him a most valuable worker, and the students a solicitous teacher and friend.

Revision of the United States Pharmacopœia.

OFFICIAL ANNOUNCEMENT.

THE convention for the revision of the United States Pharmacopœia will be held in the City of Washington, May 7th, at noon. As it is necessary that some preliminary arrangements should be prepared in advance of the convention, I have taken upon myself the responsibility of appointing the following delegates to act as a Committee of Arrangements:

Dr. Samuel C. Busey, Dr. C. H. A. Kleinschmidt, Dr. Robert T. Edes, of Washington; Mr. P. W. Bedford, of New York, and a committee appointed by the National College of Pharmacy of the following members: W. S. Thompson, J. A. Milburn, and S. E. Waggaman, M.D.

As soon as arrangements are completed, a circular will be mailed to each organization whose credentials are received by me before April 10th, and to any delegate who will forward his address on a stamped envelope enclosed to me.

As president of the convention of 1880 for the revision of the United States Pharmacopœia, I will report that up to the first day of March I have received certificates of credentials from the following list of delegates. If there are any errors in the same, either in initials or names, I would respectfully request that corrections be sent to me, P. O. Box 3281, Boston, Mass. As there are a large number of

delegates appointed whose credentials have not yet reached me, a supplementary list will be published later.

ROBERT AMORY,
President Convention 1880.

Boston, Mass., March 15th, 1890.

MEDICAL SCHOOLS AND COLLEGES.

Albany Medical College.—Maurice Perkins, M.D.; J. M. Bigelow, M.D.; W. P. Mason, M.D. *Alternates.*—H. E. Webster, M.D.; F. G. Curtis, M.D.; W. G. Tucker, M.D.
Baltimore Medical College.—J. W. Foster, M.D.; R. H. Ellis, M.D.; J. D. Blake, M.D.
Central Medical College.—S. E. Earp, M.D.; J. B. Long, M.D.; G. W. Vernon, M.D. *Alternates.*—J. O. Stillson, M.D.; M. V. Morgan, M.D.; J. A. Sutcliffe, M.D.
Columbia Medical College (College of Physicians and Surgeons).—G. L. Peabody, M.D.
Dartmouth Medical College.—H. M. Field, M.D.
Georgetown Medical School.—C. H. A. Kleinschmidt, M.D.; G. L. Magruder, M.D.; J. I. Stafford, M.D. *Alternates.*—G. W. H. Lovejoy, M.D.; Frank Baker, M.D.; J. B. Hamilton, M.D.
Harvard Medical College.—Charles Harrington, M.D.; Francis H. Williams, M.D.
Howard Medical College.—W. H. Seaman, M.D.; J. E. Brackett, M.D.; C. R. Defour, M.D. *Alternates.*—T. B. Hood, M.D.; Robert Reyburn, M.D.; C. B. Purvis, M.D.
Missouri Medical College.—Charles O. Curtman, M.D.
Michigan Medical College.—H. F. Lyster, M.D.; P. C. Freer, M.D.; H. M. Hurd, M.D. *Alternates.*—R. H. Stevens, M.D.; B. F. Dawson, M.D.; J. H. Dawson, M.D.
Miami Medical College.—Daniel Milliken, M.D.
National Medical College.—D. W. Prentiss, M.D.; W. W. Johnson, M.D.; E. T. Fristoe, M.D.
New York Medical College (University Medical College).—W. M. Thomson, M.D.
Pennsylvania Medical College.—Wm. Pepper, M.D.; Theodore G. Wormley, M.D.; John Marshall, M.D. *Alternates.*—G. A. Pierson, M.D.; John Guiteras, M.D.; J. Tyson, M.D.
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Syracuse Medical College.—John L. Heffron, M.D. *Alternate.*—W. M. Smith, M.D.
Virginia Medical College.—J. W. Mallet, M.D. *Alternate.*—W. B. Towles, M.D.

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Maryland Medical Society.—E. F. Cordell, J. E. Atkinson, T. B. Brune.
New York Medical Academy.—F. A. Castle, M.D.; A. H. Smith, M.D.; G. G. Needham, M.D. *Alternate.*—W. T. Alexander, M.D.
North Carolina Medical Society.—T. F. Wood, M.D.; R. S. Young, M.D.; J. M. Baker, M.D.
Philadelphia College Physicians.—Alfred Stillé, M.D.; J. M. Hays, M.D.; J. C. Wilson, M.D. *Alternates.*—T. J. Mays, M.D.; F. P. Henry, M.D.; J. W. Holland, M.D.
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Marine Hospital Service.—Surgeons C. S. D. Fessenden, M.D.; Walter Wyman, M.D.; John Godfrey, M.D.
Navy.—Surgeon J. M. Flint, M.D.

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Louisville (Ky.) College.—C. L. Diehl, B. Buckle, E. Goebel. *Alternates.*—A. J. Schoettlin, E. Spiedel, O. C. Dilley.

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Massachusetts College, Boston, Mass.—S. A. D. Sheppard, E. L. Patch, C. C. Williams.

National College, Washington, D. C.—W. S. Thompson, J. R. Walton, H. E. Kalusowski. *Alternates.*—W. G. Duckett, G. G. C. Simms, R. L. Eliot.

New York College.—Charles Rice, P. W. Bedford, H. H. Rusby.
Pennsylvania College, Philadelphia, Pa.—M. Roche, H. C. Archibald.

Philadelphia College, Philadelphia, Pa.—J. M. Maisch, J. P. Remington, A. B. Taylor.

Pittsburgh College, Pittsburgh, Pa.—A. Koenig, J. A. Koch, J. B. Cherry. *Alternates.*—F. H. Eggers, L. Emanuel, S. H. Stevens.

St. Louis College, St. Louis, Mo.—J. M. Good, O. A. Wall, F. W. Sennewald. *Alternates.*—G. H. C. Klie, C. Gietner, H. M. Whelpley.

University of Michigan, School of Pharmacy, Ann Arbor, Mich.—A. B. Prescott, O. C. Johnson, A. B. Stevens. *Alternates.*—F. A. Thompson, T. C. Schlotterbeck, W. T. Jackman.

University of Wisconsin, School of Pharmacy, Madison, Wis.—F. B. Power.

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Kansas.—L. E. Sayre, Lawrence; George Leis, Lawrence; R. J. Brown, Leavenworth. *Alternates.*—J. T. Moore, Lawrence; C. L. Becker, W. C. Johnston.

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Texas.—James Kennedy, San Antonio.

Wisconsin.—C. H. Bernhard, Madison; J. C. Huber, Fond du Lac; A. Conrath, Milwaukee. *Alternates.*—A. H. Hollister, Madison; J. A. Dadd, Milwaukee; H. T. Eberle, Watertown.

The railroads in the territories of the Trunk Line Commission, Central Traffic Association, and the Southern Passenger Association, which practically includes all the lines between New York State on the east, Chicago, St. Louis, and the Mississippi River on the west, and all the Southern States, will make the convention rate of a full fare going and one-third fare returning (on the usual conditions) to all delegates and their friends to Washington and return. In the New England States and Michigan, as also north of Chicago and west of the Mississippi River, no concession can be obtained. Circulars giving fuller particulars will be issued later.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,422.—**Raspberry Syrup (and Clarifying of Syrup)** (Albany).

The official formula for Syrupus Rubi Idæi produces a very pleasant preparation, but it is perhaps not as well adapted to be used in connection with carbonated beverages, or as flavoring of lemonade, as one containing a smaller quantity of sugar. For such purposes Dieterich recommends the following formula:

Bruise 1,000 parts of raspberries, allow the pulp to stand during two days at the ordinary in-door temperature, and then express the liquid portion. Add to this 20 parts of powdered sugar, and when it is dissolved fill the juice into narrow-necked bottles so as to reach up to the neck, tie parchment paper over their mouths, and allow to ferment at in-door temperature until no more carbonic acid gas is given off, or until a sample of the juice is no longer rendered turbid when mixed with half its volume of alcohol. Then filter.

Next clarify (see further on) 500 parts of sugar with 330 parts of distilled water, so as to obtain a product of 580 parts, add $7\frac{1}{2}$ parts of citric acid and afterwards 450 parts of the filtered juice. Raise once to boiling, skim carefully, and strain through flannel.

The clarification of the syrup is directed to be performed in the following manner: Mix the sugar (best, white, if possible free from blueing) with the water. After half an hour raise the mixture to boiling, and carefully skim off any scum that may form on the surface. Continue the boiling until the mixture becomes

viscid, that is, until threads can be drawn from the mass by the stirrer. Then add one-half of the quantity of water first used, and again boil and skim until the product amounts to 700 parts for every 600 parts of sugar employed.

It has been recommended to increase the keeping qualities of this syrup by adding 0.1 Gm. (1½ grains) of salicylic acid to each kilo (2 pounds) of expressed juice before fermentation, and the same amount to each kilo of the finished syrup intended for export.

No. 2,423.—Liquor Stomalgicus (Easton).

A formula for such a compound (literally translated, "mouth-ache liquid") has been used on the Continent of Europe. The following is the formula :

Sodium Bicarbonate.....	80 grains.
Borax, powdered.....	16 "
Oil Peppermint.....	5 drops.
Diluted Alcohol.....	½ fl. oz.
Aqueous Tinct. Rhubarb (Nat. Form.).....	20 min.
Water	enough to make 10 fl. oz.

Dissolve the oil in the diluted alcohol, and the salts in a sufficient quantity of the water. Mix the two solutions, add the aqueous tincture of rhubarb and lastly enough water to make 10 fl. oz. Shake the mixture well and repeatedly during about half an hour, then filter.

A tablespoonful of it is usually mixed with about half a cupful of lukewarm water, and the mouth rinsed out with it when there is a sour taste noticeable. The tincture of rhubarb is added only as a coloring agent.

No. 2,424.—Literature on Technology and Physics (Baltimore).

The most useful technological dictionaries, for those who wish to translate from one language to another, are the following :

1. Tolhausen, "Technologisches Wörterbuch"; small 8vo, Leipzig, 1876. In three languages : English, French, and German, each of these being made the leading language in a separate volume.

2. Eger (Gust.), "Technologisches Wörterbuch"; 8vo, Braunschweig. In two volumes (English-German and German-English). This is more complete than the first-mentioned one, but it omits French.

The most advanced modern text book on physics is the new edition of Mueller-Pouillet's "Lehrbuch der Physik u. Meteorologie"; 9th edition, by Pfaundler. Volume 1 (containing mechanics and acoustics) and Volume 3 (containing electric science) are now complete. It is published at Braunschweig (Vieweg). Ganot's Physics is somewhat behindtime, and in many respects does not go deep enough into the subject.

No. 2,425.—Baking Powder (O. W.).

A good baking powder may be produced by following the formula given by Mr. C. A. Crampton, who made a special investigation, some time ago, of American baking powders. He recommends :

Bitartrate of Potassium, powdered.
Bicarbonate of Sodium.
Corn.

No. 2,426.—Dialyzed Iron and Peptonate of Iron (Reading).

So-called peptonate of iron is a solution containing peptones in combination with iron, probably by the intervention of a minute quantity of ferric chloride which remains in the compound. The following formula and directions are recommended by Dieterich. In the first formula we have substituted the corresponding preparations of the U. S. Pharm. for those of the German Pharm. As the peptonate of iron is to be prepared from the so-called "dialyzed iron," we give the latter formula first:

1. *Liquor Ferri Oxylchloridi.*

("Dialyzed Iron.")

Solution of Chloride of Iron (U. S.).....	87 parts.
Water of Ammonia,	
Distilled Water, each.....	a sufficient quantity.

Mix 75 parts of water of ammonia with 75 parts of water, and gradually pour this mixture in a thin stream, while stirring, into 77 parts of solution of chloride of iron. (The precipitate thereby produced is redissolved as fast as it is formed, and the solution acquires a dark color and now contains oxylchloride.) Now add 250 parts more of water.

Next prepare a mixture of 25 parts of water of ammonia and 500 parts of distilled water, and then pour both this and the previously prepared liquid, in thin streams and under constant stirring, simultaneously into a vessel of sufficient capacity and containing 2,000 parts of water. Wash the precipitate by decantation (removal of the supernatant water by means of a siphon three times each day, and pouring on fresh water) until the wash water is free from chlorine. Now press the precipitate until it weighs only 100 parts, transfer it to a flask containing 10 parts of solution of chloride of iron (or 2.1 parts of hydrochloric acid, U. S. Ph.), and promote solution by shaking. When the precipitate is dissolved, dilute to 250 parts, allow to deposit during a few days, and filter.

Finally bring the filtrate to a spec. grav. of 1.050. This corresponds to a yield of about 280 parts.

The product must not be exposed to daylight.

2. *Liquor Ferri Peptonati.*

Solution of Oxylchloride of Iron (the preceding solution).....	120 parts.
Dry Peptone (Gehe's).....	30 "
Solution of Soda (specific gravity 1.160).....	q. s.
Hydrochloric Acid (specific gravity 1.124)....	1.4 parts.
Alcohol.....	100 "
Aromatic Tincture (National Formulary)....	10 "
Distilled Water.....	a sufficient quantity.

Dilute the solution of oxylchloride of iron with 2,000 parts of water. Dissolve the peptone (which must contain no chloride of sodium) in 2,000 parts of water, and pour this solution, under stirring, into the iron solution. Now neutralize the mixture (which is nearly clear) very carefully and exactly with enough solution of soda (about 3 parts will be required) previously diluted with twenty times its weight of water, and wash the produced precipitate by decantation until the washings no longer contain chlorine. Then collect the precipitate upon a dense, wetted linen strainer, and allow the water to drain off. Next transfer the thick mass to a capsule, add the hydrochloric acid, and warm over a steam-bath until complete solution has taken place. Next add the alcohol (and, if required, the aromatic tincture; this is to be replaced by the same amount of water, if the product is not required to be aromatized), and enough water to produce 1,000 parts.

The product is a clear, dark reddish-brown liquid, of a strongly acid reaction, having a slight ferruginous taste, and containing 0.42 per cent of iron.

A soluble peptonate of iron can be prepared only from an oxylchloride such as is obtained by the first given formula.

No. 2,427.—Pharmacopœia Revision (Several Inquirers).

The Convention which assembles every ten years at Washington does not do the actual work of revising the Pharmacopœia, since the details involved in this work are too numerous and require too much time and study to be settled in a few days. The object of the Convention is, first, to establish the general principles which are to be followed by the actual revisers, including, perhaps, a few of the more important details, in case it should be felt that specific instructions on one or another matter should be given; second, to appoint a Committee of Revision to carry out the plan agreed upon.

One of our correspondents thought that the text of the Pharmacopœia would be taken up seriatim, and that the members present were expected to propose changes where deemed advisable. It is safe to say that the Convention would have to remain in permanent session for many months, if it were required to undertake the actual revision itself.

No. 2,428.—Bromine Solution for Urea Estimation (Drs. J. H. McA. and B. F. S.).

You will find the whole method of urea estimation, and formulas for preparing the test solutions, on page 63 of our volume for 1889.

Regarding the bromine solution, however, we would say that if it is inconvenient—as our correspondents state—to weigh the final product (525 Gm.), they may make it up to a definite measure, if they have a suitable graduated cylinder with glass stopper. The proportions of bromine and of bromide of potassium given in our April number for 1889 are intended to make 365 C.c. of product, which is not exactly the meaning conveyed by the wording of the formula. We shall, therefore, give it more correctly here. But we would say that, even if the solution is prepared according to the formula given in our last year's volume, it will answer for urea estimation just as well, since there is even then enough excess of bromine.

The best proportions for preparing the solution are:

Bromine.....	90 parts.
Bromide of Potassium.....	75 "
Distilled Water.....	enough to make 365 "

Into a tared graduated measuring cylinder provided with glass stopper introduce the bromide of potassium, together with 300 parts of distilled water, and dissolve by shaking. Then add the bromine carefully, and lastly enough distilled water to make up the quantity. If grammes are taken for parts, then the 525 Gm. of product will measure 365 C.c.

Instead of weighing exactly 90 Gm. of bromine, which would be very apt to destroy the balance, it is better to take the contents of, say, four one-ounce vials of bromine, to add them to the bromide-of-potassium solution, and to note the increase in weight. It will be generally a little over 90 Gm. It is then only necessary to use a little more bromide, in proportion, and to make the product up to a proportionately larger amount.

No. 2,429.—Measuring the Capacity of a Cask (Chicago).

The U. S. gaugers use an empirical method of gauging casks, which is carried out by means of a gauging rod upon which are different scales of graduation, suitable to

the ordinary varieties of casks. This method is based upon a purely mathematical one. Mathematically, a cask—that is, the space enclosed by the staves and heads—may be regarded as two truncated cones joined together at their base; the only difference being that the sides of the cones are not straight, but more or less slightly curved. The mathematical formula representing the capacity of these two truncated cones, or, in other words, of the contents of the cask (if it be of a normal shape), is

$$\frac{\pi l}{8}(2R^2 + r^2)$$

in which π is = 3.14159 (the figure expressing the value of the circumference of a circle when the diameter is regarded as 1); l is the length of the cask, inside measure; R is the radius of a section of the cask taken at the bung-hole, and r a similar section taken at the head.

It should be remembered that the staves of a barrel are somewhat thicker at the centre than at the chime. Hence, if the bung cannot be taken out so that the inside diameter can be taken at the bung-hole, and there is nothing left but to take the outside diameter and to deduct from it the thickness of the staves as measured at the chime, it is necessary to allow for the increased thickness. A good rule is to multiply the thickness at the chime with 1.02; the product will be approximately equal to the thickness of the staves in the centre.

The rule above given for gauging a cask may be expressed in language as follows:

Add together double the square of the radius of the bung section and the square of the head section, and multiply the sum found with the product obtained by multiplying the length with 1.047197.

If the measurements have been taken in inches, the result will be cubic inches, of which 231 make 1 gallon.

There are several other formulæ which may be deduced mathematically from the stereometric figure of a cask. Without going into details, we may regard a cask as a combination of two solid bodies, viz., a cylinder with straight sides—the ends of which are formed by the two heads of the barrel—and a mantle, with curved outer and straight inner side, surrounding the cylinder. The calculation of the cylinder is a simple matter, and never varies. Its capacity is $\pi r^2 h$, that is, the product of the square of the radius, times the height, times 3.14159. It is the mantle where the difference comes in. According as the curve on its outer side is greater or smaller—and custom differs in this respect in different countries—a different formula will be required to express the cubic contents.

For casks with a more convex curve than those usually used in this country for whiskey, either of the following two formulæ will give a sufficient approximation:

$$\frac{\pi l}{60}(8D^2 + 8d^2 + 4Dd)$$

$$\frac{\pi \lambda}{9}(D + d)^2$$

in which D is the diameter of the bung-hole section, and d that of the head section.

No. 2,430.—Crystallized Protiodide of Mercury (Mercurous Iodide) ("New York City").

According to A. Stroman, to prepare a mercurous iodide absolutely free from mercuric iodide, it is necessary to start from a mercurous nitrate as free as possible from mercuric salt, and to take care that the mercurous nitrate be always in excess. Moreover, the resulting precipitate must be protected from the light.

Mercurous nitrate solution is prepared by acting upon 3 parts of pure mercury with 4 parts of nitric acid of specific gravity 1.185, warming the mixture after a few days very gently (merely to dissolve the crystals), and, if necessary, adding a little dilute nitric acid, enough to prevent recrystallization below about 70° F. On adding to such a solution a moderately concentrated solution of iodine in alcohol, in small quantities at a time, and gently agitating, yellow, shining crystalline laminae of pure mercurous iodide are deposited. If the iodine solution is added rapidly, pure mercurous iodide is likewise produced, but in form of a yellow, flocculent precipitate.

We have no personal experience with this process, and give it merely by request. The original paper is contained in the *Berichte d. Deutsch. Chem. Ges.*, 1887, page 2818, which our subscriber may consult in the library of the College of Pharmacy.

We also recommend that he consult the paper by Mr. H. MacLagan in *AMER. DRUGG.*, 1884, page 82.

No. 2,431.—Oil of Tar (R. W. S.).

This correspondent says: "Oil of tar, when freshly distilled, is colorless. How can it be preserved so, even when exposed to light, and how can it be decolorized after it has become dark colored?"

Oil of tar, so-called, is a very complex body, consisting chiefly of a terpene (oil of turpentine) and a variety of constituents of tar, volatile at temperatures up to about 390° F. It is the latter substances to which the gradual darkening of the oil is to be ascribed. There is no method or process known by which this can be prevented. By careful fractional distillation certain constituents of the

oil may be isolated, but the residue would then no longer be "oil of tar." There is no way to remove the color except by subjecting the oil to renewed distillation, and each time that this is done the new product will no longer be identical with the former.

No. 2,432.—Floor Wax (A. J. T.).

A good preparation for waxing floors may be obtained as follows:

Yellow Wax.....	25 oz.
" Ceresin.....	25 "
Burnt Sienna.....	5 "
Boiled Linseed Oil.....	1 "
Oil of Turpentine.....	about 30 "

Melt the wax and ceresin at a gentle heat, then add the sienna previously well triturated with the boiled linseed oil, and mix well. When the mixture begins to cool add the oil of turpentine, or so much of it as is required to make a mass of the consistence of an ointment.

Yellow ceresin is purified ozokerite (fossil paraffin), and may be had in almost any quantity.

The burnt sienna may be used in smaller or larger quantity, according to the tint desired, or may be replaced by raw sienna, etc.

Dieterich recommends the following:

To 400 parts of boiling water add 200 parts of yellow wax; when this is melted, add 25 parts of carbonate of potassium, boil for a moment or so, then remove the vessel from the fire and add 20 parts of oil of turpentine. Stir until cool, and dilute with water to make 1,000 parts.

If the floors are well preserved, the dilution may be carried to 1,500.

The object of the potassium salt is to form an emulsion with the wax.

No. 2,433.—Senna and its Gripping Principles (Wis.).

It is a fact long known that the resinous principles of senna possess scarcely any (if any) purgative properties. But they are reputed to be the cause of the gripping which senna often produces. Some thirty years ago it was proposed to introduce senna leaves deprived of most of their resin, chiefly for the preparation of the "Species laxantes," which are a very commonly used laxative in Europe (see *Nat. Form.*, No. 333). In the first edition of the German Pharm. this preparation was ordered to contain the purified senna leaves; but in the second edition the original, unextracted leaves were again introduced, as the therapeutists on the Revision Committee did not deem the presence of the resin of sufficient importance or disadvantage.

When senna leaves are extracted with alcohol, which is best done by percolation, the resinous principles may be almost entirely removed, if the senna was in fine powder. But when the uncut leaves are thus extracted, a good deal of the resin remains behind. Natural senna leaves contain from 5 to 7 per cent of resin. Treated with alcohol, the whole leaves will retain from 2 to 2.5 per cent of the resin. The separated resin has scarcely any laxative effect.

The treatment of senna with alcohol has the further effect that it deprives it of its peculiar odor, which is disagreeable to many persons. The *Nat. Form.* has, for this reason, provided for a Deodorized Fluid Extract of Senna (under No. 168).

No. 2,434.—Gelatin for Copying Pads (H. G.).

This subscriber wants to know what kind of gelatin is best to use for copying pads. He alludes to the hectograph, and states that he knows it to be patented.

The best kind of gelatin, in our opinion, is that variety of glue which is designated as "A, extra." A cheaper grade will answer, but we should by all means prefer the former.

Break the glue into small pieces, soak them in cold water until soft, pour off the water from the soft pieces, melt the glue, and heat, constantly stirring, until all excess of water has been driven out; that is, until no more copious aqueous vapors rise. The heating should be done by steam. Next add for every pound of glue 5 pounds of glycerin; mix well, pour out into pans and let cool, carefully removing the scum and air bubbles before the mass cools.

Type-Writer Ink.—In experimenting upon a compound suitable for use as ink for a type-writing machine, Mr. Shuttleworth made the observation that many of the colors of the aniline series are soluble in castor oil. Methyl violet is especially so, and advantage can be taken of this fact to prepare an ink of remarkable power, admitting of a large number of copies being taken from the same impression. Nigrosine was not experimented with, but it would seem possible that with it a black ink of some intensity might be produced. The incorporation and solution of the aniline color in the oil can be effected on the small scale by triturating the previously powdered pigment with the oil in a mortar, the operation being sometimes facilitated by the addition of a little alcohol. Various colored inks for stamping pads might be produced in the same way, though it has not yet been determined whether such mixtures would exercise a deleterious influence on the rubber stamp.

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NEW YORK, MAY, 1890.

Whole No. 191.

[ORIGINAL COMMUNICATION.]

QUALITATIVE TESTS FOR THE LIMIT OF IMPURITY IN CHEMICALS OF THE U. S. PHARMACOPŒIA.

BY ROBT. B. WARDER, HOWARD UNIVERSITY,
WASHINGTON, D. C.

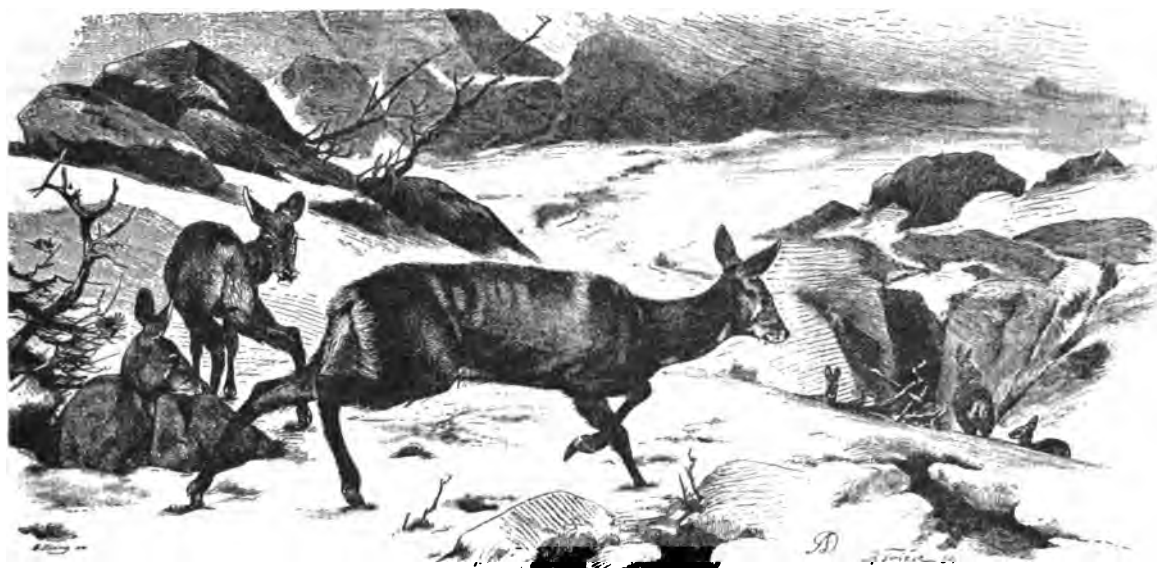
INTRODUCTION.

SEVERE criticism of the U. S. Pharmacopœia in certain points is not inconsistent with a very high estimate of its value as a whole, but judicious criticism tends to improvement, especially upon the eve of the decennial revision; and no strictures in this paper are intended to cast discredit upon the committees that have successively brought the work to its present degree of precision.

Qualitative tests are prescribed for many chemicals, with a repetition of detail again and again that would seem quite needless for any one with ordinary training in qualitative analysis; while volumetric and gravimetric

carbonate and chloride no turbidity; hydrobromic acid no turbidity or precipitate; while acidified ammonium phosphate "should remain unaffected"—although no method is prescribed to ascertain any possible change in thermal, optical, and electrical properties, viscosity, molecular volumes, etc.

Many of these variations may be explained by the peculiar habits of the contributors to the several paragraphs. Nitric acid may be used in some cases to facilitate the test for chloride with that for sulphate, and the extent of dilution prescribed for the stronger acids may be needless for lactic acid and for honey; but the distinction between cloudiness, turbidity, and precipitate is not clear, neither does any reason appear for adding the "test solution of chloride of barium with excess of hydrochloric acid" in testing citric and tartaric acids, while adding the nitric or hydrochloric acid first to ammonium nitrate, phosphate, etc. If needful to prescribe the details for ordinary qualitative tests, would it not be simpler for the next Committee on Revision to give the necessary directions once for all, and then simply to prescribe that acetic acid shall be free from lead, copper, tin, iron, calcium, nitrate, sulphate, and chloride, and shall conform to the other tests as described?



The Musk-Deer (see page 88).

processes are also employed (to say nothing of alkaloidal assays) which cannot be successfully carried out unless the examiner has had careful training in quantitative analysis. The work, as a whole, is written neither for beginners nor for experts; perhaps it was intended as a compromise for all classes of druggists and analysts. An attempt is also made to define the *limit* of certain impurities which may be allowed without detriment in the use of some chemicals; and when this limit is defined by qualitative tests, much greater precision might be gained by a uniform system of standards, while a great want of consistency is to be seen in those tests which are designed to exclude even traces of impurity, as illustrated below.

DIRECTIONS NOW GIVEN FOR DETECTION OF SULPHATES.

In tests for sulphates, as prescribed for certain acids and ammonium salts, the following variations occur, where the intention seems to be to exclude in each case any easily recognized trace. Hydrochloric and nitric acids are each diluted with five volumes of water, while the amount of dilution required for lactic acid is not prescribed; of boric acid an "aqueous solution" must be used; of citric or tartaric, "10 C.c. of a concentrated solution"; ammonium carbonate, nitrate, and valerianate are to be acidulated with nitric acid, but ammonium chloride and phosphate with hydrochloric acid.

Various quantities of test solution of barium chloride are prescribed—as a few drops for acetic acid; 20 drops for hydrochloric acid; 1 C.c., with excess of hydrochloric acid, for citric or tartaric; a small portion for phosphoric, and some for nitric acid or ammonium carbonate and phosphate; while test solution of barium *nitrate*, in indefinite quantity, is directed in testing ammonium chloride, nitrate, and valerianate. In the case of acetic, boric, lactic, nitric, and phosphoric acids, and ammonium valerianate, there should be no precipitate; citric, hydrochloric, and tartaric acids should yield no precipitate within five minutes; ammonium nitrate no cloudiness; ammonium

THE PRESENT QUALITATIVE TESTS FOR LIMIT OF SULPHATES.

Turning now to those tests in which a *limit* is prescribed for the amount of sulphate present, we find that they are to be made with "1-per-cent aqueous solutions" of magnesium, potassium, and sodium sulphites, "strongly acidulated with hydrochloric acid," where a "slight cloudiness" or "white cloudiness" may be produced by barium chloride, but (with the alkaline salts at least) "no precipitate" is allowable; sodium bisulphite is tested in the same way, except the solution must be "acidulated" instead of "strongly acidulated," and the limit is a "faint cloudiness." The distinction between a "slight cloudiness," a "white cloudiness," and a "faint cloudiness" is not very clear; neither is the difference between cloudiness and precipitate, unless the latter means such a quantity of insoluble salt as to collect quickly at the bottom of the test tube. If that is the real meaning, however, the word is not used consistently throughout the book; for the absence of a "precipitate" (not the absence of mere "cloudiness") is specified as the proof of the absence of sulphate in acetic, boric, lactic, nitric, and phosphoric acids, and in many salts. The tests for chromic and sulphurous acids are more definite, 1 Gm. of the former being dissolved in 100 C.c. of water, and one-tenth volume of hydrochloric acid being added in each case, followed by 1 C.c. test solution of barium chloride. A 1-per-cent solution is prescribed for sodium bicarbonate (either pure or commercial), but the more soluble carbonate may be made of any possible concentration. Two-per-cent solutions must be made (with the aid of acetic acid) in testing magnesium carbonate and the two alkaline acetates, but a 20-per-cent solution for honey; while no strength is prescribed for the aqueous extract from sulphurated antimony (with hydrochloric acid), nor for aqueous solution of ferric lactate, hydrochloric acid solutions of saccharated carbonate of iron and of potassium ferrocyanide, and for nitric acid solutions of soda, potassa, and potassium carbonate or bicarbonate.

Test solution of barium chloride is usually prescribed; but the nitrate (about one-half as strong) is directed for magnesium carbonate, honey, sodium phosphate and pyrophosphate. The varying quantities admissible are crudely indicated: "faint opalescence" in case of magnesium carbonate, honey, potassium acetate, sodium acetate, and sodium pyrophosphate; "slight opalescence" for sodium bicarbonate; "faint cloudiness" for magnesia, for solutions (liquores) of potassa and soda, and for sodium phosphate; "slight cloudiness" for potassa and soda (when the solid is tested); while a "slight turbidity" is allowed in potassium carbonate or quinine hydrobromate and hydrochlorate; a "trifling precipitate or cloudiness" in potassium ferrocyanide; a "slight precipitate" in quinine valerianate; a "trifling precipitate" in sodium carbonate, and anything less than an "immediate precipitate" with the commercial bicarbonate.

Probably few chemists or druggists have suspected the amazing complexity of detail in the official directions for applying this common test, one of the simplest and easiest in the whole range of qualitative analysis. Since no clear distinction is made between the essential and the non-essential, the analyst who takes this book for his guide will be likely to regard all details with some indifference, make up his solutions according to his own convenience, and suffer some bias of judgment in discriminating between cloudiness and precipitate. The reasons for the discrepancies are not far to seek, when we consider the multitude of workers whose various tastes and habits here find expression. A marked individuality is seen in tests for purity of the alkaline bromides and iodides. The formula for potassium and sodium bromides and sodium iodide reads thus: "On adding to 1 Gm. of the salt, dissolved in 20 C.c. of water, 5 or 6 drops of test solution of nitrate of barium, no immediate cloudiness or precipitate should make its appearance (limit of sulphate)." The direction is modified for ammonium bromide only by substituting barium chloride for the nitrate; for ammonium iodide, by adding the parenthesis "(with a few drops of diluted hydrochloric acid)"; potassium iodide (if there is no misprint) must be dissolved in 30 C.c. of water; and the formula for calcium bromide differs only by substituting the word "sulphate" for "limit of sulphate" in the final explanation. The habit of verbal precision which marks these paragraphs may be due in part to the tests for limit of chloride, which require the use of volumetric solution of silver nitrate. The test for limit of sulphate in these salts (as well as for foreign halogens in the alkaline iodides) depends upon the slow rate of chemical action in very dilute solutions; and the needless introduction of time as an essential element of the test is undesirable. If the prescribed quantity of barium solution is carefully dropped out from the reagent bottle in making the test, the word "immediate" will imply a much shorter time with an expert manipulator than with a novice.

A PLAN SUGGESTED, BASED UPON THE USE OF DILUTE STANDARD SOLUTIONS FOR COMPARISON.

The object of this paper is not to find fault with the tests as now officially prescribed, but to suggest an improvement.

Both volumetric and gravimetric processes are prescribed in many articles of the Pharmacopœia, but the needless extension of these would detract from the popular character of the work. Any revision of the present method of testing should conform, where practicable, to existing usage, should require as few additional appliances as possible, and should prescribe essentials only, while recommending in detail whatever may subserve the convenience of the operator. I propose, in all the ordinary qualitative tests for impurity (except where mere traces are to be excluded), the following essential features:

1. A solution of the chemicals to be tested, of known strength.
2. A dilute standard solution, reacting like the impurity to be limited.
3. Direct comparison of the two solutions, so conducted as to allow a careful judgment of the relative intensity of the two reactions.

Let us now consider the most convenient method of carrying out these essentials in the average drugstore, for which the work is designed.

In preparing solutions of the chemicals to be tested, a strength of 1 per cent is now prescribed in so many cases that this may be regarded as the rule, exceptions being indicated where necessary. The solution of 1 Gm. made up to 100 C.c. should be regarded as a sufficiently accurate approximation for the qualitative tests.

The standard solutions for comparison may be prepared by suitable dilution of the "test solutions" of the U. S. Ph., if these are carefully made. Under the present directions, 1 part of the solid is usually dissolved in 10 parts or in 20 parts of the solvent; test solution of potassium cupric tartrate alone (about $\frac{1}{10}$ normal) contains a given weight of salt, made up to a given volume. The system of making up to a certain volume in each case would seem most convenient, unless measuring flasks are rare among druggists; but this is a practical point which others must decide.

The present test solution of potassium sulphate contains one-sixteenth by weight of salt, or about 34 Mgm. of sulphur in each C.c.; while the 1-per-cent solution contains 10 Mgm. of salt in each C.c. If 1 C.c. of such test solution is diluted to 340 C.c., it would contain 0.1 Mgm. of sulphur in each C.c. If equal volumes of the two solutions (treated at the same time with equal volumes of solutions of barium) give like precipitates, the salt contains not far from 1 per cent of sulphur, probably a larger amount than will be allowed in any chemical, if the requirements of the new Pharmacopœia keep pace with the progress of manufacture. The formula for a given chemical might read: "a 1-per-cent solution must contain less sulphur than an equal volume of dilute standard solution"; or, for a higher standard of purity, a 2-per-cent solution, 5-per-cent solution, etc., may be specified.

Further details of the plan can be worked out to better advantage after the Committee on Revision have determined what degree of purity shall be required for the official standard.

In case of acids the precipitation may be hindered; these may be nearly neutralized before diluting to the requisite volume, if special experiments prove this to be needful.

Finally, in making the comparison of the two solutions, two modifications of method have been tested. One is to use test tubes of like size, and note precipitate by transmitted light. It is most convenient to stand a few feet from a window and look at a horizontal bar of the sash through both tubes; a difference in opacity is then easily seen. Similar results are obtained by holding a pencil or the finger horizontally behind both tubes, but care must be taken to hold it equally distant from both.

Perhaps a more satisfactory method of comparison is the use of two small beakers of the same size, containing 10 to 30 C.c. of each solution (making the fluid 1 to 3 Cm. in depth), and placing these upon a printed page. That of the U. S. P., with its variety of type, is well adapted for the purpose, and it will usually be found that some of the letters can be seen more distinctly through one of the fluids than through the other.

To complete the proposed system, it will be needful to agree upon the strength of the dilute standard solutions. A selection from the "test solutions," diluting about 1, 2, or 3 C.c. of each to 1 liter, may prove convenient.

ADDITIONS TO THE PHARMACOPŒIA.

In order to present the objects of this paper in more concrete form, the following matter is suggested for the revised Pharmacopœia, with the recommendation that details be subjected to a rigid investigation, under a committee of competent analysts, before their final adoption.

Add to the "Preliminary Notices," page xli., as follows:

Qualitative Tests for Impurity of Chemicals.

These tests are of two kinds: First, to show that all traces are absent (such, at least, as may be recognized by the usual methods), and, second, to show that traces, if present, do not exceed the limit fixed by the Committee. The analyst is expected to understand the general principles of qualitative analysis, as set forth in the ordinary text books on this subject, and to conform to their requirements. The directions here given are intended to indicate the degree of precision expected in the exclusion of impurity, and are based upon the judgment of the Committee regarding the standards practicable in the present state of chemical industries.

The following conditions must be observed (so far as they are applicable), except as modified by special requirements printed elsewhere:

Solution to be Tested.—This shall contain not less than 1 per cent (or 1 Gm. per 100 C.c.) of the solid substance to be examined. Fluids may be diluted to 5 volumes. Strong acids may be partly neutralized, and salts may be acidified (as may be needful in special tests) previous to such dilution.

Quantity of Reagent Used.—Test solutions may be added, amounting to one-tenth of the volume of solution tested: 10 C.c. and 1 C.c. are recommended in most cases, when traces are to be excluded.

Definition of Precipitate.—Any perceptible cloudiness or opalescence appearing within ten minutes after the addition of test solution, when examined in good light, will be regarded as a precipitate; and the chemical shall be deemed impure, except when a special "limit" is fixed as the standard.

Dilute Standard Solutions.—This new class of reagents is designed to aid in fixing the limit of impurity, and they must be made with care to contain the prescribed proportion of each reagent. When prepared by diluting "test solutions," these also must be made of the exact strength named. They will be indicated by the following brief designations:

Solution A: Made by diluting 1 [2, or 3] C.c. test solution of potassium sulphate to 1 liter; used in testing for limit of sulphate and alkalies.

Solution B: Made by diluting — C.c. test solution of barium chloride with pure distilled water to 1 liter; used in testing for the limit of alkaline earths and chlorides. On adding test solution of silver nitrate to "Solution B," the opacity should not perceptibly increase in diffused daylight after the first minute.

It may be desirable to add others, as:

Solution C: Containing magnesium sulphate, for tests of magnesium and sulphates.

Solution D: Containing sodium carbonate or potassium bicarbonate, for tests of carbonates and alkalies.

Solution E: Containing ferric chloride, to test for iron.

Method of Testing for Limit of Impurity.—The essential point is to make a direct comparison (under like conditions) of the solution under examination with an equal volume of the "dilute standard solution." The reaction for impurity should always fall below that of the standard. For tests which depend upon precipitation, equal volumes of the two solutions are to be placed in similar vessels, and equal quantities of the reagent added to both.

Either of the following methods may be used; the first being the simpler, while the second admits of nicer distinctions. Care must be taken to have the vessels equal in size, and especially to observe through layers of equal thickness. If the opacity rapidly increases, the reaction should continue until no further change is apparent.

First Method: Mix 10 C.c. each of the two solutions with 1 C.c. of test solution in test tubes; observe a horizontal bar through both, and note which fluid is the more opaque.

Second Method: Mix like portions (20 C.c. each) with test solution in two small beakers, and place these on a sheet of test type; note the smallest letters that are legible through each.

The Estimation of Urea by Means of Hypochlorite.

MR. D. B. DOTT recently presented the following paper on the estimation of urea to the Pharm. Society of Great Britain (after *Pharm. Journ.*):

Of the various methods which have been proposed for the estimation of urea, that which enjoys most favor as an expeditious and sufficiently accurate process is the hypobromite method. Urea and hypobromite react according to the general equation: $\text{COH}_2\text{N}_2 + 3\text{BrHO} = \text{CO}_2 + 3\text{HBr} + 2\text{H}_2\text{O} + \text{N}_2$. A strong alkaline solution is employed, whereby the carbonic anhydride is absorbed, so that it is only necessary to measure the volume of nitrogen, and, after the usual corrections, to calculate its equivalent of urea. The calculation shows a constant deficiency of very nearly 8 per cent of the urea actually present.

Different forms of apparatus have been suggested for conducting the operation, a useful modification being described by Mr. Gerrard. Mr. A. H. Allen advised the adoption of the nitrometer for the purpose, and that is the arrangement which I have employed. I have not, however, used hypobromite, but *hypochlorite*, and that is the point which I wish to bring forward. The solution of hypochlorite is easily prepared by mixing one part of chlorinated lime with three of water, and filtering. The nitrometer is now filled with this solution, and a measured quantity of the urine (say 4 C.c.) introduced by the funnel, any small amount adhering to the sides being washed in with a few drops of distilled water. The tube is now turned over twice from its perpendicular position, in order to mix the liquids, and in a few minutes the reaction is complete. It is well to introduce a little baryta solution to make sure that all the carbonic acid is absorbed, and then a few drops of methylated spirit to remove the froth and permit the reading to be accurately made.

The following results were obtained. With hypochlorite solution 2 C.c. urine gave—

(a).....21.6 C.c. nitrogen.
(b).....21.6 " " "

A solution of pure urea was prepared containing 2 Gm. in 100 C.c., and 4 C.c. of the solution treated with the hypochlorite solution:

(a).....29.0 C.c. nitrogen.
(b).....28.8 C.c. "
(c).....29.0 C.c. "

Twenty-nine C.c. nitrogen, after making the necessary corrections, are very nearly equivalent to the 0.08 Gm. urea used. These results indicate that the hypochlorite of calcium is as trustworthy a reagent as the hypobromite of sodium. But, it may be asked, does the former possess any advantages over the latter? I decidedly think so. In the first place, the hypochlorite of calcium solution keeps unimpaired for a considerable time, while the sodium hypobromite rapidly deteriorates and becomes useless. Secondly, the hypochlorite solution is easily prepared, while the hypobromite solution is rather troublesome and disagreeable to make, especially where there is not a good draught. Lastly, the hypochlorite solution is much less costly than the sodium hypobromite.

THE MUSK DEER.*

THE Berlin Zoological Garden has come into possession of the first living specimen of the male musk deer which has ever reached Europe. Dr. Heck, the director of the Garden, obtained it last year, by purchase, from W. Jamrach, the well-known importer of animals, etc., of London. On looking at the little animal when lying in its cage, it appears like a puny fawn of dark chocolate-brown color, with a few indistinct but lighter stripes and spots upon the rump, and a somewhat grayish head ending in a peculiar broad snout. When it is at liberty, however, its movements and actions are so singular that it seems to many visitors to have a resemblance to a kangaroo. A favorite position of the animal is to sit upon its haunches, curving the back very considerably, and placing its fore feet far between its hind feet. Frequently, after remaining in this position for a long time, it suddenly twists, lifts and turns the fore part of its body in a most astonishing and almost incredible manner, jumps to and fro, and suddenly perhaps assumes the rôle of a beast of prey cautiously sneaking or prowling. Its small, long, and pointed hoofs are placed flat on the ground, and the fetlocks are so low that they touch the ground likewise. No illustrations which have heretofore appeared, and which have been made after museum specimens, do justice to the animal. No doubt its agility, build, and manner of movement are closely connected with the features of the rugged and mountainous regions of its habitat, which extends throughout eastern and central Asia at an elevation about equivalent to the snow line. The male animal is distinguished from the female particularly by having protruding tusks, like those of a boar; on the other hand, there is not a sign of antlers noticeable.

The illustration accompanying this note is taken from the *Illustrirte Zeitung* (Leipzig), No. 2434.

Tincture of Musk.

THE U. S. Pharmacopœia directs that tincture of musk should be made of 10 parts of grain musk extracted with dilute alcohol to yield 100 parts of tincture. The official musk is pure grain musk, which in recent years has ranged in price from \$20 to \$35 per ounce, making a tincture prepared by this process cost from \$30 to \$50 per pint. It is charged that the amount of menstruum used is not sufficient to exhaust the musk, and the process is consequently extravagant and wasteful of this expensive drug. To show the truth of this, 1 Gm. of musk, treated by the official process, yielded 20 per cent of extractive. The residue again treated with the same amount of menstruum yielded a tincture with 6 per cent of extractive, and a third maceration gave a tincture still containing a considerable amount of odorous matter.

The writer suggests that the process be revised so as to give a strength of 8 grains per fluidounce with diluted alcohol as a menstruum. This tincture would be nearly identical with the Ger. Pharm. tincture.—G. M. BERINGER, *Am. Jour. Pharm.*, April, 1890.

The Behavior of the Cinchona Alkaloids towards Xylol and Mayer's Reagent.

A. J. SWAVING and A. HILGER have had occasion to investigate the solubility of the four principal cinchona alkaloids in xylol (boiling point 136-139° C. = 277-282° F.; mixture of para- and meta-xylol), and have found the following rates:

1 part of	At 15° C. is soluble in — parts of xylol.	At 138° C. is soluble in — parts of xylol.
Quinine.....	909	155
Quinidine.....	211	8
Cinchonine.....	7407	170
Cinchonidine.....	2223	7.8

The temperature 138° C. happened to be the boiling point of the xylol used in these experiments.

Though the authors make no further statement regarding the application of the above data, it is evident that a method of separation of cinchona alkaloids can be based thereon.

The authors have also studied the ratio existing between the four alkaloids and Mayer's reagent (an aqueous solution of 13.546 Gm. of mercuric chloride and 49.8 Gm. of potassium iodide diluted to 1 liter):

One cubic centimeter of Mayer's solution corresponds, respectively, to

0.0106 Gm. Quinine.
0.0092 Gm. Quinidine.
0.0079 Gm. Cinchonine.
0.0091 Gm. Cinchonidine.

—*Mittheil. a. d. pharm. Inst. Erlangen*, ii., 282.

The Botanic Gardens at Kew.

It is now about two hundred years—the exact date is not known—since Lord Capel laid out the garden that has become a scientific institution of world-wide fame and influence. Switzer says, in his quaint "Iconographia Rustica," 1718: "The earliness with which this lord appeared in gardening merits a very great place in my history, and a better pen than mine to draw it." On the death of Lord Capel in 1696, the estate of Kew House, including the Garden, passed into the hands of his son-in-law, who added to its importance for a while by making it the headquarters of English astronomy. It was afterwards leased by Frederick, Prince of Wales, son of George II. The Garden was made a scientific establishment—what they called a "Physic Garden" in those days—by the widow of Frederick, the dowager Princess Augusta, under the advice of the Earl of Bute. She employed William Aiton to direct the scientific work, and Sir William Chambers to direct the decorative gardening. "Science will ever be grateful to the one," says a writer in the *Saturday Review*, "and Taste will never forgive the other while his constructions remain." In 1768 Sir John Hill published a catalogue of the plants at Kew. There were fifty ferns, about six hundred trees and shrubs, and several thousands of herbaceous plants. The list was not greatly lengthened twenty-one years after, when Aiton issued the "Hortus Kewensis" with the aid of Dr. Solander. But the collections made by Sir Joseph Banks in Captain Cook's famous voyage were deposited here; then those of Robert Brown and Allan Cunningham, who had accompanied Captains Flinders and King respectively to Australia; then the plants of Brazil and the Cape of Good Hope, gathered by Messrs. Bowie and Masson; those of Caley, and Kerr, and Menzies, and a host of smaller collections. In 1810 William Aiton, the younger, published a new edition of his father's work, which contained nearly 10,000 descriptions. About 1789 the estate was bought by George III., who devoted much of his leisure to its improvement. But evil days followed the death of Sir Joseph Banks, in whom Kew had a friend at court. For all Aiton could do, the Gardens sank into neglect, and in 1838 it was proposed to disestablish and disendow them. A protest was raised, and, after further consideration, the Gardens were surrendered by the crown and became a national establishment in 1840. Sir W. J. Hooker was appointed director in the following year. Kew has been fortunate in having had few changes in its directors. It was in charge of William Aiton from 1759 to 1793; of William Aiton, Jr., from 1793 to 1840; Sir W. J. Hooker was director from 1841 to 1866; his son, Sir Joseph D. Hooker, from 1866 to 1886; and to him has succeeded Mr. W. T. Thiselton Dyer.

Under the directorship of Sir W. J. Hooker the Royal Botanic Gardens rapidly advanced in importance. During his term of office a report of the Progress and Condition of the Gardens was made annually. This was superseded in 1883 by a monthly Bulletin of Miscellaneous Information. The early reports of Sir William Hooker are interesting, besides their historic and scientific value, for the evidence they give of his sturdy, ceaseless battles with the Treasury. The director is pathetic, indignant, and argumentative by turns, and one way or another he continued to worry on till better times. In 1844 Sir William took the first important step of his administration by petitioning for a grant of the Royal Fruit House, which he offered to fill with his private collection of plant products. It was allowed in 1847, and thus the Museum of Economic Botany had its origin. This branch of the establishment now occupies three buildings. Every tree and plant which is known to serve a useful purpose is represented there, with illustrations of the manner of its employment, if possible. While the collection is very popular with the holiday visitor, who comes only to be entertained, any one can understand its serious value to an ingenious and thoughtful mechanic or manufacturer. The Museum of Timber is largely used already. Cabinetmakers and furniture manufacturers quite recognize by this time what a store of hints for their craft is garnered here. The utility of the Economic Section, moreover, is by no means confined to the inhabitants of the British Isles. From every quarter of the globe samples of new products are sent for examination and report.

So long ago as 1815 an Herbarium and Botanical Library had been projected at Kew. George III., doubtless persuaded by Sir Joseph Banks, even raised a building for the purpose. After Sir Joseph's death, however, the scheme lapsed, and the building was granted to the King of Hanover. On his decease, Sir William Hooker urged the fulfilment of the old design, and his petition was granted when Mr. Bentham and Dr. Bromfield bequeathed their collections to the nation. The Herbarium of Kew is the largest in the world, and by far the most useful, because it is also most admirably arranged. The number of specimens in it is not on record. At Sir William Hooker's death, twenty-four years ago, a rough estimate made the number a million, exclusive of duplicates. The written catalogue fills two gigantic volumes, and has to be continually posted up, for the collection increases by twenty thousand or so yearly. The dried plants in their portfolios stand in cases, and all are arranged upon the system

of Sir Joseph Hooker's great work, the "Genera Plantarum." The student has only to give the number attached to any genus in that book, and the case is unlocked and the portfolio laid before him in a moment. There are no formalities to check the young scholar here. He has but to present his credentials to Prof. Oliver, keeper of the Herbarium, sign his name, and get to work. There are interesting features at every step of this noble collection, fascinating bits of history connected with every group of cases which bears the name of some distinguished botanist, the fruits of whose life-long labor are stored here. Of all these perhaps the herbarium of Dr. Lindley is the most attractive. It occupies only four small cabinets, but the contents will surpass the visitor's utmost expectations. On the lower floor is preparing the catalogue of all plants known, for which Mr. Darwin left a bequest. Mr. Dayton Jackson, Secretary to the Linnean Society, has had the work in hand over three years, and it is not nearly finished. He employs a staff at the British Museum also. The catalogue of the library is not printed, but is contained in a ponderous manuscript volume in the keeper's room.* The books include, besides all modern volumes and pamphlets on botany, a great number of those antique curiosities which bibliomaniacs treasure.

The work at Kew covers a vast field. In the first place, officially, stands the botanic interest—to study new plants and class them. Next, where plants are wanted for cultivation which cannot be obtained readily in the market or which the service of the public demands, the Royal Gardens will supply them, if possible. Where diseases or vegetable or animal pests threaten local plantations, Kew will look into the matter and consult with experts at home. Kew is ready also to report and to obtain advice upon new industries which those upon the spot suggest. Furthermore, it keeps an eye on all institutions of the same class throughout the British Empire, which act in concert with their great model in the mother country, and through it with one another. Foreign institutions co-operate in like manner with Kew to a certain extent. From time to time the authorities at Kew publish a list of new plants, which at present seem to average five hundred to six hundred a quarter, including those renamed for scientific purposes. From time to time, also, it publishes a list of the seeds matured in the Royal Gardens, which are exchanged, on application, with all regular correspondents. One of these seed lists includes something like four thousand species. This magazine of seeds is collected, nominally, for the benefit of institutions which may be able some time to return the favor in part, but in practice no one who applies with a serious purpose for seeds or plants is refused. How the rapidly increasing population of the globe is to be provided with food and clothing is a problem which the authorities of Kew believe falls within their department. They welcome every vegetable product which is reported to have qualities that make it useful to mankind, whether as a food, a medicine, a convenience, or a substance useful in manufactures. They are glad to report upon specimens of such substances, or to obtain the reports of trustworthy experts.

The story of the cinchona plantations is a good instance of the work of the Royal Gardens. Some forty years ago both the English and the Dutch authorities in the East Indies took alarm at the growing price of quinine, due to the rapid decrease in the forests of cinchona in Peru. The Dutch moved first, and imported a great number of seeds and seedlings, which they planted in Java at a heavy cost. But, probably because they had no Kew to advise them, the Dutch had chosen a species which was hardly worth growing, and the plantations have long since been uprooted. For some years the English government confined itself to importing seeds and plants, which died on the passage to India. This was evidently futile, and Sir William Hooker urged a systematic procedure. Mr. Clements Markham in 1859 was sent to Peru to collect seeds and young trees. When he returned, his precious stores were received at the Gardens, nursed, and transmitted to India with trifling loss. This effort was successful. In the plantations of Bengal, laid out and managed by officers recommended by Sir William Hooker, there were, at the date of the latest report, about 5,000,000 trees. From Kew cinchona trees have been distributed also to all parts of the world where there was a chance for successful cultivation. The plantations of Ceylon are only inferior to those of Bengal. In Jamaica the sales of bark exceed £5,000 a year. The tree has been introduced also into St. Helena, Trinidad, Mauritius, Cape of Good Hope, Queensland, and many other settlements. The output of the cinchona drugs from these sources up to 1880 was 87,704 pounds, which, taking quinine at an average value of \$2 an ounce, would represent \$2,806,527.

Ipecacuanha is a plant scarcely less important than cinchona itself. But few members of the vegetable kingdom so absolutely refuse to exist under anything short of perfectly satisfactory conditions. In 1866 Sir Joseph Hooker sent a specimen to the Botanical Gardens at Calcutta, which promptly died. Then a struggle began in which the advantage was now on one side, then on the other. In 1875 the director of the Calcutta Gardens tri-

* This is a specimen of British conservatism which can find few admirers in this country, where the card catalogue is in such general use.—Ed. Am. Druggist.

umphantly reported that he had 100,000 nice young plants, but in 1886 the strain received from Kew direct alone survived—less than 5 per cent—and all hope of successful cultivation in India has been abandoned long since. Plants had been sent out to Singapore, however, in 1875, with much more lively confidence, and there perseverance found its reward. Ipecacuanha is established in the Old World at last, and the authorities of Kew may be trusted to diffuse the cultivation. Another instance is Liberian coffee, distributed from Kew to take the place of that grown in the East Indies, which was affected with a fungoid pest, and that of the West Indies, which suffered from the white fly. Liberian coffee, moreover, will thrive in hot and moist situations, where the Arabian variety is unable even to live. It has been introduced in a great many places; but, although its growth is very promising, it has nowhere become the general crop. This imperfect success was another problem for the investigators of Kew, and the solution is now believed to be found in the fact that the treatment proper for the Arabian berry after gathering is not suited to the Liberian with a widely different pulp.

Among the many questions sent to Kew from all parts of the world, there must be some of trivial importance, or which could be perfectly well answered at the local botanic gardens; but all genuine inquiries receive attention. Debate has been gravely held, opinions even have been formed and reported, upon such matters as a South African cane which some gentleman in those distant parts thought adapted for fishing rods; upon the value of West African palm kernels as material for coat buttons; upon a pithy stem which the government of a West India island believed suitable for razor strops.

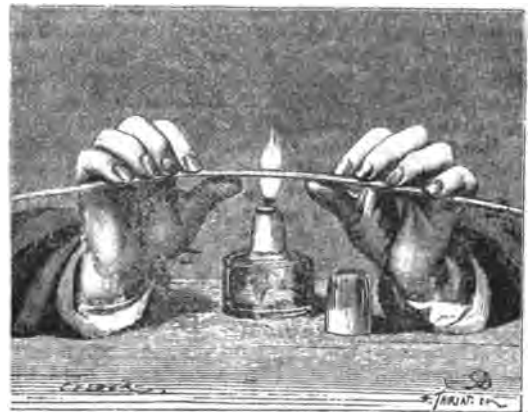
One function of a national institution very seriously regarded at Kew is the training of young men to fill botanic situations in the colonies. Something is demanded of such young men beyond the practical knowledge which suffices at home. Instruction is given them in the principles of scientific botany and those general conditions which rule the practice of horticulture under differing circumstances. The advantage of this system all around scarcely needs illustration. While serving the interests of the colonies it increases the sources of information for Kew, since all these emigrants keep up more or less of a correspondence with the institution in which they were trained.

The village of Kew lies on the south side of the Thames, about six miles westward from Hyde Park Corner in London. "The Gardens" are a favorite resort for holiday-makers and tourists, being visited by six or seven hundred thousand persons yearly. Painters also flock there in summertime. When the crown surrendered its rights to them in 1840, the Gardens had an area of eleven acres and contained ten greenhouses of one sort or another. Sir William Hooker promptly begged permission to annex the Orangery and the land adjacent; then a part of the Pleasure Grounds; and after that the Royal Kitchen and Forcing Grounds. All these petitions being granted, by 1847 the Gardens had reached their present dimensions—about seventy acres. Three years later, the rest of the Pleasure Grounds was granted for the establishment of an Arboretum, making the total area little less than two hundred and fifty acres. "The Arboretum is the richest in Europe, no doubt," says the writer in the *Saturday Review*, "but probably inferior to that of Harvard University, where special attention has been paid to this department." This admission in a British journal, and the *Saturday Review* above all others, should be very gratifying to Americans. The failure of Kew's Arboretum to be the finest in the world is explained on the ground that the soil—sandy and shallow, resting on a stratum of gravel—is unsuited to many kinds of trees. In former times, also, when an imperial collection had to be got together as quickly as possible and as cheaply, specimens were not planted with the care which might have overcome the disadvantage. It became necessary to reconstruct the Arboretum twenty years ago on this account. A singular example of the influence of fashion in gardening then came to light. The British public had been running after evergreens so hotly that nurserymen had ceased to grow deciduous species. It seems incredible that the authorities of Kew should have asked in vain for months throughout England, Scotland, and Ireland for young aspens. As for American oaks, maples, etc., they absolutely could not be found in the kingdom. Unscientific lovers of the beautiful may rejoice that it has not yet been found necessary to interfere with the old forest trees planted, perhaps, by Lord Capel. The newcomers are arranged by genus—all the willows, for example, with the alders, around the pretty lakes, pines here, cedars there, oaks, nuts, maples, tamarisks, camellias, ranunculus, etc.

In the Garden proper the smaller plants are found in bewildering array. No list of the species represented at Kew has been taken since that of the younger Aiton in 1810, but one is now being made. Some departments have been catalogued already. Of orchids there are about 1,400 species; ferns, 1,100; stove plants, 2,500; succulents, 1,000; palms and cycads, 500; greenhouse plants, 3,000; herbaceous, 4,000; trees and shrubs, 3,000. In several cases, however, the figure is but a guess as yet. The total, great as it will prove to be, bears but a small

proportion to the sum of Nature's wealth. If we take the flowering plants alone as enumerated in Bentham and Hooker's "Genera Plantarum," there are 200 natural orders, 10,000 genera, and 100,000 species; and this leaves out of account the ferns and all the lower orders of the *Cryptogamia*. The Economic Section has few visitors, and they are not tempted to carry exploration far. Not a few of the culinary and medicinal herbs in use are found here. If by some fatal chance the onion of commerce should be exterminated in the back gardens of England, Kew is prepared to replace it. Side by side therewith grow the patience-dock and the skunk-cabbage, the briony, the cuckoo-pint, the Japanese yam, and the all-good. In ferns the Kew collection is exceedingly rich. It has had three special benefactors in this department, to the first of whom, Mr. George C. Joad, the public is indebted for the charming rock garden opened in 1881. Sir Joseph Hooker had long been working for one, and the bequest of Mr. Joad's collection of ferns brought the matter to a crisis. Dr. Cooper Forster was an enthusiast upon the culture of filmy ferns, and Mr. W. C. Carbonell was specially interested in the cultivation of hardy ferns, particularly in the crossing of them and the development of sports. Both these gentlemen bequeathed their treasures for the nation's enjoyment when their own power of enjoying them ended.

The glass houses at Kew are extensive structures. The Winter Garden covers more than an acre and a half of ground. The Palm House is 362 feet long and 100 feet wide. The new Orchid House is 140 feet in length, adding the two wings together. This last is not wholly satisfactory—to the orchid enthusiast an orchid house never is nor can be. Supplemented, however, by a low, neat range, from which the public is excluded, nearly all the 1,400 which form the national collection thrive admirably. British orchidists are proud of Kew nowadays, for it was not so satisfactory in this department a few years since.—FREDERICK A. FERNALD in the *Popular Science Monthly* for May, 1890.



A FEW HINTS ON GLASS-BLOWING.

WHILE an ordinary alcohol lamp or Bunsen burner will answer as a source of heat for bending or moulding glass, in cases where small tubing and soft or lead glass are to be treated, it is under all circumstances preferable to be provided with a blast lamp, since many pieces of apparatus cannot be properly constructed without this. A blast lamp, preferably for gas, may be either permanently attached to a table by a swivel joint and the blast worked by a treadle; or the lamp may be transportable, and is then best worked by a Fletcher blower, with or without the interposition of reservoir bulbs to maintain a steady pressure. A regular glass-blower's table usually has two blast lamps facing each other, so that a piece of glass held between the blasts may be surrounded on all sides by the flame.

Glass to be worked by the blast lamp is generally used in form of tubing, sometimes in form of rods. The glass to be worked should neither be too hard nor too soft, as it will be difficult to maintain it at the proper plastic degree for being shaped. If it is too hard, it is apt to congeal on one side too rapidly when taken out of the flame, for the real shaping of the glass into some form or other is always done outside of the flame. And if the glass is too soft, it is apt to bend or twist before the operator has acquired control over its formation.

Before working the tubing it should be carefully cleaned inside and outside, so as to remove all dust, grease, and particularly all moisture. It should also be free from blisters, sand grains, or other visible defects at the place where it is to be heated. A cardinal rule in working glass is, not to heat it longer or more intensely than necessary.

If a blast lamp is used, the piece of glass is first heated in the gas flame (without blast), being constantly turned, and the flame applied along some distance on either side of the working place, so as to prevent uneven shaping. When the article to be produced has been completed, it must be annealed by coating it with soot in the smoky flame of the gas jet deprived of air. If this is not done,

especially with thick glass, it is very liable to crack afterwards.

If only a small spot is to be heated—for instance, when a hole is to be blown into tubing—a small pointed flame, such as is produced with an excess of air, is used. When larger surfaces are to be heated, the full yellowish-tinged blast, with less air, is employed.

One of the most simple operations is the turning over and smoothing of the edge of tubes—for instance, that of test tubes. Here it is only necessary to maintain a uniform high temperature. For "turning over," a conical piece of wood charcoal or gas carbon, or a triangular piece of tinned iron, is used, against which the rim of the tubing is revolved in the flame. Gas carbon has the advantage over wood charcoal that it is much less liable to adhere to the glass, and that it does not ignite when brought in contact with the flame. If the rim is to be entirely laid over, it is pressed, while soft, against a polished plate of carbon. If too strong a heat is applied, so that the glass shows signs of forming drops, the rim will collapse and the work is lost.

Narrow glass tubing is better bent in simple Bunsen burners than in the blast flame. A very good burner is that which delivers a flame from a long, horizontal slit. Whatever flame is used, the actual bending of the tube must never be done in the flame, but the tube, after it has been properly heated, must be withdrawn first. The heating and bending must be done over a small extent of surface at a time, and only to a moderate degree. The wider the glass tubing is, the more care must be used by the operator. When a workman finds that he cannot bend a piece of wide tubing without causing it to be misshapen, he sometimes fills the tubing with dry sand, which, to a certain extent, maintains the round bore of the tube. If a tube has collapsed, it may often be restored by softening the collapsed part in the flame and blowing in the tube, the other end being plugged. Since the convex side of tubing, during the formation of the bend, is more stretched than the other, it must be more thoroughly heated.

A tube may easily be diminished in calibre, or drawn out to a point, by heating it uniformly over a smaller or greater surface—according as a short or long drawn point is wanted—and then gently drawing it in opposite directions. Drawing out glass, of course, diminishes its thickness. If glass is to be drawn out without making it weaker, the place to be drawn out is first reinforced by gathering upon it an extra quantity of glass by heating and pushing it together so as to increase the thickness at that particular place. This "gathering" of glass must be done cautiously and slowly, otherwise it will not be uniform, but wavy.

To form a tube closed at one end, it is first drawn out to a short point; the point is then closed by fusion, the adhering droplet of glass removed by a piece of glass rod, and the bottom smoothed by first heating, then removing from the flame and blowing into the tube held upward. If the bottom is still misshapen, it is heated again and once more blown out.

If a tube is too short to be taken hold of at both ends, one of its ends is softened in the flame, a piece of tubing or rod fused on to it, and the point thus formed.

If the bottom is required to be flat, it is first blown out as just described, then heated again in the flame and pressed upon a freshly cut, flat piece of charcoal, from which it is immediately returned to the flame and annealed by coating it with soot. If such flat bottoms are not carefully annealed, they are very apt to crack and drop off.

Indentations, either in the bottom or in the sides of glass tubes, may be produced in a similar manner by softening in the flame and forming the depressions by means of a piece of charcoal or gas carbon.

In holding a glass tube over a flame for the purpose of bending it, it should be grasped so that all weight is taken off the place to be heated. When tubing is very long, so that the outstretched arms are unable to grasp it at the proper place, one end of it is laid in the loop of a piece of rope or string hanging from the ceiling, or may be held by an assistant who is trained to follow the motions of the operator.

Heliotrope Perfume.—E. Campe's formula in the *Chemiker und Drogist* for a perfume for retail sale is:

Oil of Bergamot.....	1½ oz.
Vanillin.....	8 grains.
Tinct. Benzoin.....	2 drachms.
Rectified Spirit.....	60 oz.

Cochineal.—The cultivation of cochineal on the Island of Teneriffe was commenced about sixty years ago, and in 1831 the first exports (about 19 pounds) were made. The shipments rapidly increased until 1869, when the maximum quantity of 1,888,708 pounds was exported. Since that time the cochineal trade has been on the decline, owing to the introduction and diffusion of the coal-tar dyes; and the culture of the vine is again attracting more attention.

Notes on Essential Oils from Messrs. Schimmel & Co.'s Report.

THE following notes on various essential oils and allied substances are taken from the *April Bericht* of Messrs. Schimmel, of Leipzig:

Distillation in Vacuo.—In some introductory remarks Messrs. Schimmel report that they have succeeded in attaining a practical solution of the problem of distilling essential oils on a large scale in a vacuum. It is stated that the first large apparatus of the kind erected in their establishment has been at work for some weeks, and that the results leave no doubt that the influence upon the distillation of essential oils will be great, since the injurious action of heat upon the easily decomposable oils is avoided in proportion to the diminished atmospheric pressure under which they are distilled.

Anise Oil and Anethol.—As characters for determining the value of anethol the specific gravity of the pure compound at 25° C. is given as 0.986 and the melting point as 21° to 22° C., the latter being taken by simply inserting a thermometer into a flask with melting anethol. Ordinary anise oil is said to melt at 15° C., and the inferior qualities of anethol obtained by fractional distillation, between 15° and 21° C., according to the degree of purity. By repeated contact with a small portion of anethol is oxidized, probably to anise aldehyde, the change involving an increase in specific gravity and a lowering of the melting point. A sample of anethol that had been remelted frequently and come into contact with air had a melting point of 19° to 20° and a spec. grav. of 0.990 at 25° C.

Arnica-Root Oil.—The stock of arnica-root oil having become exhausted, and no German roots being available, an experiment was made in distilling Italian roots, but these proved utterly worthless.

Betel Oil.—Referring to Eykman's latest communication upon betel-leaf oil, the opinion is expressed that the differences observed by that chemist in the constituents of the oil distilled by himself and that distilled by Schimmel & Co. cannot be attributed exclusively to the fact that the former was distilled from fresh leaves and the latter from dry, but are more probably referable to differences as to soil and climate in the conditions under which the plants they were derived from were grown. According to Eykman not only the two oils, but the phenols separated from them, differed in odor, the phenol from the oil distilled by Schimmel & Co. from dry leaves not even recalling the smell of betel leaves. But in comparing the phenols from a specimen of oil distilled from fresh leaves, placed at their disposal by Dr. de Vrij, Messrs. Schimmel failed to distinguish the slightest difference in odor from that of their own betel phenol, notwithstanding that the mixture from this oil of fresh leaves evidently contained a second phenol. Further experiments are deferred until the receipt from India of a supply of oil distilled from fresh betel leaves.

Carrot Oil.—The oil obtained in the distillation of the dried fruit of *Daucus Carota* has been examined by Dr. Landsberg, who finds it to consist essentially of two constituents: (1) a terpene boiling between 159° and 161°, belonging to Wallach's groups of pinens; (2) an oxygenated body, of the composition of C₁₀H₁₆O, standing in near relation to cineol, and that may be considered as terpene monohydrate. No practical use for this oil has yet been found.

Cascarilla Oil.—There has been a remarkable demand for this oil within the last six months, but it is not known for what purpose it has been required.

Cassia Oil.—As a consequence of the exposure in a former report of the adulteration in China of cassia oil with resin, it is stated that this practice was at once abandoned. Some subsequent shipments, however, although of normal specific gravity, thin and beautifully clear, and free from adulteration with resin, petroleum, or fatty oil, were deficient in sweetness, and left on the tongue an unpleasant bitter taste. Upon determining the proportion of cinnamic aldehyde, this was found to be low, varying between 49.4 and 69.8 per cent. Further remonstrance was therefore made, with the result that a later consignment contained from 70.9 to 77.7 per cent of cinnamic aldehyde, a quantity more nearly corresponding to that found in some old samples of the oil, as recorded in a previous report. Incidentally to the discussion, Messrs. Schimmel received the information that the Chinese now export two qualities of cassia oil, one distilled from the leaves and the other from the root of the cassia shrub, but it is not known at present which kind contains the larger proportion of cinnamic aldehyde. It is still considered that cinnamic aldehyde is the most important constituent of cassia oil, and the following indirect method of estimating it is recommended: 75 Gm. of oil are mixed in a good-sized flask with 300 Gm. of a boiling 30 per cent solution of acid sodium sulphite. Cinnamic aldehyde separates immediately as a coagulum, and the mixture is well shaken and left to stand. When the proportion of aldehyde is large there is considerable development of heat, which must be controlled with cold water. About 200 Gm. of hot water are then added and the whole is

heated, with frequent agitation, in a water-bath until the compound of aldehyde with the bisulphite is completely dissolved and the non-aldehydes form an oily layer on the top. After cooling, the non-aldehydes are removed by shaking first with 200 C.c. and then with 100 C.c. of ether, the ethereal solution is separated, the ether carefully driven off, and the residue weighed. The weight, deducted from that of the oil taken, gives the proportion of cinnamic aldehyde.

Elemi Oil.—This distillate is said to be coming into demand as an addition to soap perfumes.

Eucalyptus Oil.—It is reported that eucalyptus oil is now prepared on a large scale in the south of France. In Gladstone, Queensland, arrangements are said to have been made by a local chemist for the distillation of oil from *Eucalyptus citriodora*, a species that grows plentifully in Port Curtis district, to the extent of working up half a ton of leaves daily. The distillation of an oil from a eucalyptus, having a peppermint-like odor, is also spoken of. This oil, it is thought, would probably be derived from *Eucalyptus Haemastoma*, since an oil from this species, previously examined, was found to contain, besides terpene and cymol, an oxygenated constituent, possibly identical with menthon.

Fennel Oil.—The knowledge of the composition of fennel oil has hitherto been very superficial, being limited to the fact that it consists principally of anethol. A recent examination of the fractions boiling at low temperatures has shown that, besides acids and aldehydes, dextro-pinen is present in large quantity. The fraction boiling at 160° consists of dipenten. There was also found a substance boiling at 190°–192°, having an intensely bitter, camphoraceous taste, to which, conjointly with pinen and dipenten, the peculiar odor of fennel is due. This body is being further investigated.

Galanga Oil.—Sp. gr. 0.921 at 15° C.; boils between 170° and 275°. The oil contains considerable quantities of cineol, to which the camphor-like odor is due.

Galbanum Oil is described as pale yellow and of a very pronounced galbanum odor; specific gravity 0.914 at 15°; boils between 165° and 300° C., apparently without decomposition.

Pine Oils.—The consumption of different varieties of pine oil is said to have considerably increased during the recent epidemic. The oil from *Pinus Picea*, as well as the finer sorts of oil from *P. sylvestris*, have also been recently much used in the bonbon industry. It is pointed out that in the manipulation it is necessary before all things to prevent resinification by adding the oil dissolved in a little spirit to the sugar after it has cooled; if this rule be neglected, the bonbons acquire a disagreeable resinous taste. *Ol. pini pumilionis* has been introduced into the new edition of the Austrian Pharmacopoeia, where the characters of it given are "colorless or green-yellow, peculiar aromatic agreeable odor, aromatic bitter and acrid taste; specific gravity, 0.850; boiling point, 170° C." Messrs. Schimmel say that, unfortunately, these statements do not correspond to facts, and give no assistance in judging a genuine oil. According to their experience with pure distillates, the specific gravity is 0.861 to 0.865 at 15° C., while the boiling point is about 160°–250°.

Valerian and Kesso Oil.—The oil distilled from Japanese valerian or "kesso root" is said to have rapidly come into favor (*Pharm. Jour.* [3], xix., 327, 843). From a practical point of view it is considered to be at least equal to the distillate from German roots, and possibly of still more powerful and persistent odor. The remarkable difference in the yield and composition of the essential oils, it is thought, might have its origin in climatic and soil conditions, especially since it has been shown that kesso root is not, as at first supposed, derived from *Patriaria scabiosifolia* Link., but from a variety of *Valeriana officinalis* L. It is pointed out that in the new edition of the Pharmacopoeia Neerlandica the specific gravity of valerian oil is given at 0.930–0.960, and in the Austrian Pharmacopoeia at 0.950, and that only the distillate of the European root would meet this requirement. The kesso oil or Japanese valerian oil has a sp. gr. of 0.996 at 15° C.; it is of a green color, possesses a somewhat thickish consistence, and in respect to odor can scarcely be distinguished from ordinary oil of valerian. When distilled over an open fire considerable quantities of aldehydes and the lower fat acids first pass over; then a hydrocarbon boiling at 160°, recognized as lævo-pinen. In the portion boiling between 170° and 180° dipenten was detected, but whether it was originally in the oil, or was first formed under the influence of the acids and other constituents, has not yet been determined. The fraction boiling between 200° and 220° showed the presence of l-borneol and terpineol. Between 240° and 260° the acetic and valerianic ethers of the l-borneol passed over. Some of the foregoing bodies were already known with certainty to occur in ordinary valerian oil, whilst the presence of the others was highly probable. One constituent absent, however, from the ordinary oil, but present in the Japanese, is an oil boiling at 300°, heavier than water, and almost odorless. This oil proved to be the acetic ether of an alcohol that has been named "kessyl alcohol," and represented by the formula $C_{11}H_{19}O_2$. It was obtained

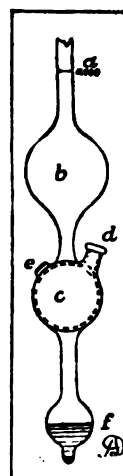
by saponification with alcoholic potash in large crystals shaped like a coffin lid, melting at 85°, boiling under ordinary atmospheric pressure undecomposed at 300°–302°, and under a pressure of 11 Mm. at 155°–156°, and yielding a lævogyre alcoholic solution. By oxidation with potassium bichromate and sulphuric acid, a body was obtained containing two atoms of hydrogen less than the alcohol, which crystallized in dense needles, melting at 104°–105°, and boiling between 305°–307°; a solution was strongly dextrogyre. Kessyl alcohol is a monacid alcohol; the acetyl compound, which has the formula $C_{11}H_{19}O_2 \cdot CH_3CO$, is a thick, oily, colorless liquid, with a lævogyre action on polarized light. In addition, kesso oil contains another constituent boiling at about 260° C.; it is probably a sesquiterpene, but no crystalline hydrochloric compound was obtained from it. Finally, in the highest boiling portion there is a blue oil contained, possibly the same as that which occurs in chamomile oil and other essential oils.—*Pharm. Jour.*

A NEW SPECIFIC-GRAVITY APPARATUS.

A NEW apparatus for determining specific gravity has been constructed by Aug. Eichhorn.

It consists of a glass spindle having a graduated stem (of which only the lowest part is shown in the cut) and three bulbs, one of which (c) is intended to be filled with the liquid to be examined, while b is empty and contains mercury as ballast.

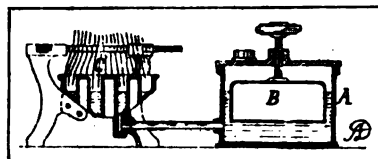
When the specific gravity of a liquid is to be determined, it is brought to the temperature of 15° C. (59° F.), and the globe c of the apparatus then filled with it, so that when the stopper is inserted in d there will be no air bubble inside. The apparatus having been thoroughly wiped, if necessary, it is now immersed in water at 15° C., when it will sink to a certain depth. The figure on the stem even with the level of the water represents the specific gravity of the liquid.—*Germ. Pat.* 49,683.



ALCOHOL LAMP WITH ADJUSTABLE BURNER.

W. KLIPPHANN, of Dresden, Germany, has patented an improved alcohol lamp (*Germ. Pat.* 48,118) of the following construction:

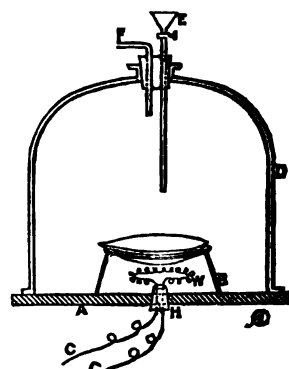
The lamp consists of a reservoir, A, connected with the burner C. The latter has a conical bottom. The reser-



voir contains a float adjustable by a screw. When the reservoir has been filled and closed, the level of the alcohol in the burner may be adjusted by raising or depressing the float in the reservoir by means of the screw. In this manner the flame may be made small or large at will.

ELECTRICITY AS A SOURCE OF HEAT IN CHEMICAL WORK.

MR. R. FESSENDEN describes some new forms of chemical apparatus (in *Chem. News*) in which electricity is used as the source of heat. We give here a description of his apparatus for rapid evaporation in vacuo.



A is a piece of plate glass, with hole bored in centre, and fitted with a cork, H, carrying two wires which are connected to the ends of the platinum coil, W, packed in magnesia. The dish, with the liquid, is placed on a stand B, and covered by a bell jar. F is connected to a filter pump, and the ends of the coil to a primary battery. More liquid is added from time to time through E.

The Manufacture of Phosphorus.

FROM a paper on the present methods of manufacturing phosphorus, by J. B. Readman, and published in the *Journal of the Society of Chemical Industry*, we take the following:

Indescribing the manufacture of phosphorus as at present carried on, I purpose dividing it into several stages under the following heads:

1. The preparation of phosphoric acid from phosphate of lime and sulphuric acid, with description of the apparatus employed.

2. The concentration of the phosphoric acid, together with an account of the mixture of the acid with carbonaceous matter.

3. Phosphorus retorts and furnaces, with description of the distillation and condensation.

1. *The Preparation of Phosphoric Acid, etc.*—This is prepared from one or other of the mineral phosphates of lime, which is ground to a fine powder and then decomposed with chamber sulphuric acid of 1.55 specific gravity. The decomposition is effected in large wooden tuns made of pitch pine or other suitable wood and provided with agitators, also made of wood.

Open steam is blown in during the operation. Sufficient sulphuric acid is added to convert all the lime present in the phosphate of lime into sulphate of lime.

After the expiration of some hours, during which the contents of the tuns are continually agitated, the emulsion is run off to large wooden filters lined with lead and provided with false bottoms, or having ashes in layers of various sizes spread over the floor of the filters.

Here the hydrated sulphate of lime is separated from the solution of phosphoric acid, which passes through the filter as a bright and clear sherry-colored fluid.

At first the phosphoric acid runs from the filters at a specific gravity of 1.17, but gradually it gets reduced by careful washing to 1.01 specific gravity.

Special precautions are observed to avoid cracks on the surface of the gypsum contained in the filters, the formation of which would form too ready an outlet for the washing water.

Whenever the effluent from the filters reaches the specific gravity 1.01 the washing is stopped, and the hydrated sulphate of lime is piled up in the centre of the filters to drain, and finally it is thrown out.

This waste product generally contains about 62 per cent of water, and when this is expelled by heat, what is known as phosphatic gypsum is obtained.

2. *The Concentration of the Phosphoric Acid, and Apparatus employed.*—The strong phosphoric acid liquor flowing from the gypsum filters is blown by one of the acid-resisting steam elevator "blow jacks" to stock tanks, and from there it is run by gravity to the evaporators, which are circular tanks made of iron or wood lined with thick lead, and heated by means of lead coils and high-pressure steam. Each evaporator is provided with an agitator, which is kept in motion during the evaporation.

Sulphate of lime, which is slightly soluble in the acid liquors, is deposited as the evaporation advances, and so great does this deposit become that filtration or decantation is necessary before the acid attains the degree of concentration required. If no agitation is employed during the concentration, the gypsum firmly attaches itself to the coils, forming around them a thick coating which must be removed by chipping. The precipitated gypsum is thrown on a filter and washed in the manner previously described. When the clear acid liquor becomes concentrated to specific gravity 1.4 or 1.5, the evaporation is stopped and any deposited gypsum again separated.

The strong solution of phosphoric acid should now contain a mere trace of lime. Any iron, alumina, or magnesia present in the original phosphate of lime is dissolved to a considerable extent by the sulphuric acid treatment and appears in the acid liquor.

The strong syrupy acid is now mixed with carbonaceous matter, such as wood charcoal or coke, in coarse powder, to the extent of about 25 per cent. It is then carefully desiccated either in iron pots or in a muffle furnace, so as to expel the moisture, sulphurous acid, and hydrocarbons, and afterwards it is carefully stored away in air-tight iron boxes ready to be used in distillation.

3. *Phosphorus Retorts and Furnaces, with Description of the Distillation and Condensation.*—The distillation is carried on in small bottle-shaped retorts, made of the best weathered and prepared Stourbridge fire clay. These retorts or pipes are about 3 feet long by 11 inches in external diameter, the clay being about 1 inch thick. The retorts are placed in a furnace something like a Belgian zinc furnace in construction, but having only two tiers of retorts, each row being placed back to back with their narrow mouths projecting an inch or so through the brickwork.

There are twenty-eight retorts in one furnace; that is to say—taking one side of the furnace and considering it for a moment—there are in the first tier seven retorts, and directly above these there are seven others, making fourteen retorts, which, as explained, project slightly

through the side of the furnace. The other side of the furnace is similarly equipped.

The mouths of the retorts are connected to the condensers by two-inch malleable iron or copper pipes, which are luted with clay joints both to the retort and the condenser. Hot water is used in the condensing trough, so that whenever the phosphorus is condensed it fuses and runs down by gravity to the lower end, and may then be lifted out conveniently by a ladle. Each retort holds between twenty and thirty pounds of phosphorus mixture, and yields up the phosphorus which exists in the free uncombined phosphoric acid in about fifteen hours.

When distillation is completed, the two-inch pipes are disconnected from the retorts, the residue is rapidly withdrawn, and the bench of retorts again recharged, the heat being steadily maintained. Should a retort be cracked or fused either at the distillation or charging, any phosphorus mixture it may contain is withdrawn, the dampers are closed, and the retort removed from the furnace. A new retort, heated in an adjoining kiln to the required temperature, is substituted, and all proceeds as before.

The crude phosphorus thus obtained is dark mahogany brown in color. It contains a good deal of impurity.

4. *Refining and Packing.*—The crude phosphorus is fused under water in a lead-lined circular tank heated by lead coils for high-pressure steam, or steam-jacketed. As much water as can be safely decanted off the surface of the crude phosphorus is removed, and about 4 per cent of bichromate of potassium (or the weight of the crude phosphorus) is added in solution. An agitator with which the vessel is provided is set in motion and is continued in motion during refining. After stirring for half an hour with the solution of bichromate, about the same weight of oil of vitriol is added; in this way chromic acid is formed, which oxidizes the lower oxides of phosphorus and leaves the element pure and nearly colorless. Another method of refining, and one more suitable under certain conditions, is to redistil the crude phosphorus in an iron retort. The phosphorus distils over rapidly and at a comparatively low temperature. A combination of these two methods is in some way desirable.

The refined phosphorus is next moulded into "wedges" or "sticks." The wedges are made by melting the phosphorus and transferring it to circular tin dishes 10 inches in diameter by 4 inches deep, and when filled a star-shaped mould is introduced into each, which divides the circle into 10 wedge-shaped pieces, suitable for packing into tin cases.

After this cold water is introduced, which soon solidifies the phosphorus and admits of its easy removal.

Pitjecor.

THIS is the name bestowed by Casati (*Raccoglitore Medico*) upon an absolutely pure cod-liver oil, deprived of fat and non-emulsified, mixed with a certain proportion of creosote, which latter dissolves easily in all oils and is not modified by them. One tablespoonful of the new preparation corresponds to two of ordinary cod-liver oil. It has the property, according to Casati, of destroying the bacillus of tubercle, rapidly diminishing the tuberculous secretion, suppressing the hectic fever and night sweats, and rapidly ameliorating the general condition. Its effects upon nutrition, says Casati, are most striking, the patient gaining in weight almost from the commencement of its use. The "*huile de foie de merue creosotée*," or creosoted cod-liver oil, prepared by Rigand & Chopoteaut, of Paris, seems to be about the same thing as the "pitjecor" of Casati, and some remarkable instances of its value in phthisis have recently been recorded in French medical journals.

Note on Sulphonal.

THE results of an exhaustive physiological and clinical study of sulphonal are communicated by Dr. John Gordon, of Aberdeen, to the *British Medical Journal*. In its effects upon muscle substance, it would appear from this that sulphonal has a close resemblance to paraldehyde and urethane. The clinical experiments show that small doses (5 to 10 grains) have the effect of increasing the excretion of urea, while doses of 30 to 40 grains decrease the excretion. The hypnotic has a tendency to decrease the excretion of phosphates. It has practically no effect upon digestion. The most important part of the paper is that in which the author shows that small doses are useless for producing sleep; at least 30 grains must be given, and sometimes 60 to 80 grains are required. Generally there are no unpleasant after-effects, but occasionally the drug appears to give rise to certain cerebral symptoms, notably giddiness, and distinct feelings of depression.—*Chem. and Druggist*.

Terpin Hydrate in Whooping Cough.—Dr. Manasse recommends in the *Therapeutische Monatshefte* the use of terpin hydrate as a remedy for whooping cough. He used it with success in forty-one cases, giving it to young children even under a year old, in daily doses of 22 grains; the average dose in powder form was 7 to 15 grains three times a day. He claims to have observed, after four or five days of the treatment, a distinct decrease in the number and intensity of the attacks.

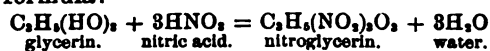
THE INDUSTRIAL PREPARATION OF NITROGLYCERIN.

THE manufacture of nitroglycerin dates back about twenty years, but a description of the process employed is not commonly met with, most descriptions relating only to its preparation in the laboratory and on a small scale.



FIG. 1.—The preparation of nitroglycerin in the laboratory.

Nitroglycerin is produced by the action of nitric acid on glycerin—a reaction which may be represented by the following formula:



Besides the nitroglycerin obtained by replacing the three molecules of hydroxyl of the glycerin by three molecules of nitric peroxide, there is, as may be seen, a formation of water, which is absorbed by the addition of sulphuric acid.

In the manufacture of nitroglycerin the apparatus used is capable of producing about 100 Kgm. of the substance every half-hour. Fig. 2 shows the interior of the laboratory; Fig. 3, the appearance of the apparatus; Fig. 4, a bird's-eye view of the works at Cengio, in Italy.

Before passing these works in review, let us study the preparation of one kilogramme of nitroglycerin.

Prepare separately in a glass cylinder (Fig. 1) 1.5 Kgm. of nitric acid at 48°, and 3 Kgm. of sulphuric acid at 66°; allow this to cool, after having sufficiently stirred it with a glass rod; then place the cylinder in another receptacle, filled with cold water, and drop into the mixture 500 drops of glycerin marking 30°, stirring all the time.

The reaction is accomplished when the glycerin is introduced, and the nitroglycerin settles at the bottom of the cylinder in a whitish, opaque mass of flaky aspect.

Rid the mixture of the excess of acid, wash thoroughly with water, and finally with a solution of carbonate of sodium until test paper shows no acidity.

Thus the nitroglycerin has passed through the successive phases of industrial manufacture—preparation of the acids; reaction of the glycerin on the mixture, resulting in the formation of the nitroglycerin; separation of the acids; washing the nitroglycerin with running water, and finally with carbonate of sodium to complete its neutralization.*

Let us now consider our industrial manufactory, which will be easily understood if the reader will bear in mind the principal points of the proceedings already men-

tioned. The process is the same as that in use for the last few years at Cengio, Italy.

Though there are more elaborate machines than the one we are about to describe, there are none that are more remunerative, as the average yield in the most extensive works is never more than 200 parts of nitroglycerin for 100 parts of glycerin submitted to the reaction—proportions obtained at the works we have taken for a

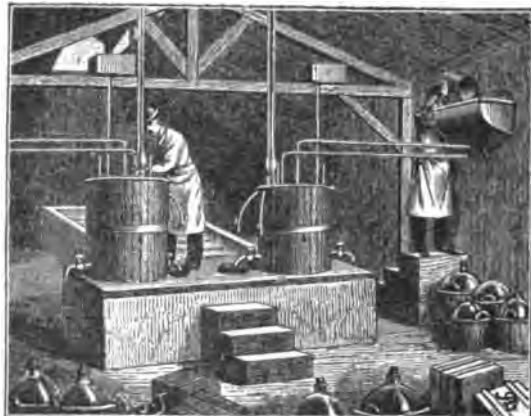


FIG. 2.—Preparatory laboratory of nitroglycerin at Cengio (Italy).

model. The two principal machines connected with the manufacture of nitroglycerin are, first, the pump supplying running water for the different manipulations; and, second, the machine for the compression of air, which furnishes the air necessary for the stirring and mixing of the ingredients.

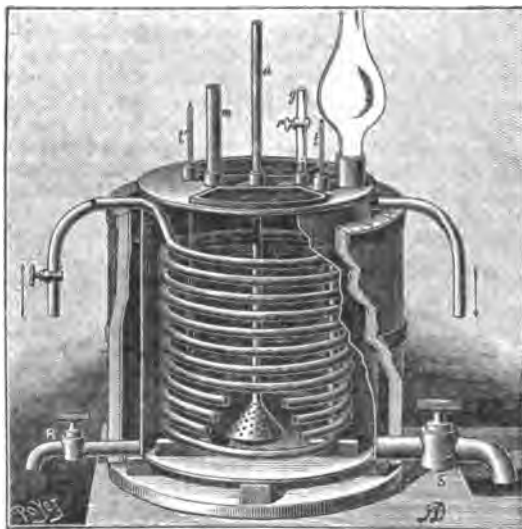


FIG. 3.—Industrial apparatus used in the manufacture of nitroglycerin.

As the point of congelation varies with the external temperature, from 8° to 9°, sometimes even 10°, above zero, the least change in the atmosphere makes it necessary to heat the workroom by means of steam pipes, which are supplied by a boiler placed in an out-building distinct from the sheds where the dynamite is made (Fig. 4). The sheds are sunk in bastions of earth which surround and protect them. In the first and most important building we see the process of the reaction of the glycerin on the nitric and sulphuric acids, already explained. Three or four apparatuses, similar to the one represented in Fig. 3, are ready to act; each one destined to furnish 100 Kgm. of nitroglycerin every half-hour, that being the time allowed for reaction.†

The apparatus consists of a cylinder made of staves and strongly bound with hoops, the whole being encased in lead, which resists the action of the acids. The dimensions of the cylinder are as follows: 0.95 M. high by 0.85 M. in diameter, making the capacity about 500 liters. Into this cylinder is emptied the given proportion of the acid mixture—usually about 300 Kgm. of sulphuric acid to 150 Kgm. nitric acid. These two acids once mixed, the glycerin (about 50 Kgm.) is poured in very slowly. By the time all the glycerin has been introduced the reaction is accomplished; the latter is hastened by a jet of compressed air, and the whole is cooled by two concentric streams of running water.

In half an hour, with the above proportions, the operation is finished and the nitroglycerin has only to be separated from the excess of acid with which it is mixed, then washed and neutralized.

To understand the different manipulations which are to transform the impure nitroglycerin still mixed with

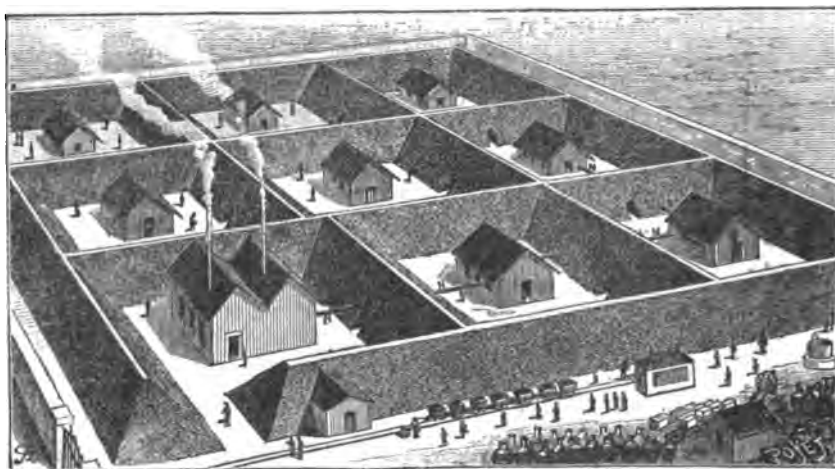


FIG. 4.—Bird's-eye view of the laboratories at Cengio.

* These operations are without danger, but might become dangerous to one not familiar with explosive bodies.

† With two apparatuses, allowing for emptying and cleaning, 700 to 800 Kgm. of nitroglycerin can be manufactured in four hours, that being the amount required for the daily manufacture of 1,000 Kgm. of dynamite.

acids, all that is necessary is to consult Fig. 4. The impure nitroglycerin must first be separated from the excess of acids, then thoroughly washed, and finally neutralized by being treated with carbonate of sodium solution.

From the preparatory house the nitroglycerin, still impure and mixed with acids, goes to another, in which, by a simple difference in density, the nitroglycerin is separated from the acids. From a large lead cylinder, which is about 1 M. high and 0.70 M. in diameter, it passes through tubes to another room, being forced through these tubes by a flow of water, cold in summer, hot in winter. Once there, it falls into wooden vats filled with water, where its separation from the acids is hastened by a jet of compressed air.

On coming out of these vats it passes into others, where, by means of compressed air, it is stirred in a mixture of carbonate of sodium.

After this the pure nitroglycerin, now neutral to litmus, is taken to another house to be transformed into dynamite. Here it is put into zinc cylinders filled with water, after which it is filtered through felt tubes to remove from it the traces of water it may have received.

If any of our readers, to finish his education on the subject, wishes to visit any of the works where nitroglycerin is manufactured, either here or abroad, let him heed a word of advice: If you go, touch nothing; do not even look too long, or you may bring home with you severe neuralgic pains, due to the rapid action of the vapors arising from the nitroglycerin on an organization not accustomed to it. This intoxication is a thing for which as yet no remedy has been found, and it is one of the most annoying and curious phenomena connected with the manufacture of nitroglycerin.—After *La Nature*.

The Opium Crop in Turkey.

THE following statistics give the production of opium in the whole of the Turkish Empire in Asia and Europe during the last twenty-six years, together with the highest and the lowest prices of opium (in Turkish and British currency) on the Smyrna market during the season in question. The figures show that, since 1864, there have been 128,400 baskets of opium produced in the Turkish Empire, the Persian production not being included in the returns. Deducting from this total the stock of opium now believed to be in existence—viz., 4,800 baskets (1,400 baskets in Smyrna, 700 in Constantinople, 1,700 in London, and 1,000 in America, etc.)—we have an average consumption, during the last twenty-six years, of about 4,750 baskets of opium.

The comparatively large crops obtained since 1868 are explained by the fact that until that season the cultivation of the poppy was restricted to four or five provinces in Anatolia (Konieh, Karahissar, Sourahan, Bogaditch, and the neighborhood of Smyrna), but after 1869, when the failure of the crop had caused an immense advance in the price of the drug, the cultivation was extended to other parts of the empire, over the whole of northern Anatolia, and in Roumelia. Since that period the peasants became accustomed to the cultivation of the poppy, and the prices thenceforth became dependent upon the greater or smaller yield of the crop. It is said that the future of the opium industry in Turkey is becoming more uncertain. The extension of the railway system especially operates against the continuation of opium cultivation, because it encourages the growing of cereals, which require less attention, are less easily destroyed by inclement weather, and for which the demand is not so much influenced by speculation.

YEAR.	YIELD OF CROP.	THE SMYRNA PRICES DURING THE SEASON.					
		Highest.			Lowest.		
	Baskets.	Piast.	s.	d.	Piast.	s.	d.
1864	3,400	140	=	16 6	111	=	13 0
1865	4,850	130	=	15 2	94	=	11 0
1866	1,350	160	=	18 8	122	=	14 0
1867	3,000	170	=	19 10	120	=	14 0
1868	1,600	390	=	45 6	146	=	17 0
1869	3,500	295	=	34 5	180	=	21 0
1870	4,300	270	=	31 6	130	=	15 0
1871	8,500	200	=	23 4	130	=	15 0
1872	4,460	220	=	25 8	170	=	19 1
1873	3,150	260	=	30 4	165	=	19 0
1874	2,480	274	=	32 0	130	=	15 0
1875	6,300	145	=	16 11	122	=	14 0
1876	3,250	190	=	21 6	187	=	15 0
1877	9,450	138	=	15 8	123	=	13 10
1878	6,050	145	=	16 5	120	=	13 7
1879	4,300	250	=	28 4	135	=	15 3
1880	2,100	250	=	28 4	135	=	15 3
1881	11,000	135	=	15 3	103	=	11 8
1882	4,500	135	=	15 3	90	=	10 2
1883	6,970	115	=	12 10	85	=	9 6
1884	5,400	115	=	12 10	90	=	10 0
1885	7,400	95	=	10 7	80	=	8 11
1886	7,600	164	=	18 0	63	=	6 11
1887	1,800	180	=	19 10	71	=	7 10
1888	7,300	100	=	11 0	62	=	6 10
1889	5,000	—	=	—	—	=	—

—Chem. and Drugg.

The Oils of Betel Leaves.

THE *Piper Betle* L. (*Chavica Betle* Miq.) is a creeper extensively grown in India and the Malay Peninsula, being very commonly trained on the trunk and branches of the *Eschynomene grandiflora*, a quickly growing tree, in the neighborhood of villages and in plantations. The leaf, well known as betel leaf, has long been in universal use in these countries as a masticating stimulant and aromatic. The preparation known as "pan supari" (pan, betel leaf, and supari, areca or betel nut) consists of a betel leaf made into a triangular packet, enclosing fragments of areca nut and catechu, with a smearing of wet lime. Cardamoms, nutmegs, cloves, camphor, and other aromatics are a common addition. Thus prepared it is an article of constant use for chewing among all classes. There is often a sense of languor when deprived of it; it is a staple amenity in social life, and on occasions of ceremony it is served gorgeously done up in gold leaf. When chewed it colors the saliva red, and, while it does not improve the appearance of the mouth, it is an undoubted antiseptic and stimulant, and is said also to improve the voice.*

As an article of commerce, betel leaf is always green and fresh, and in transporting or storing it great care is taken, by frequent airing and wetting, to maintain its fresh appearance. For sale, the leaves are sorted one by one, the damaged rejected, and the others, tied in small bundles, are priced according to size and quality.

The composition of betel leaf has not, to my knowledge, been thoroughly investigated. In 1885 I obtained from it by distillation two volatile oils, a heavy and a light, and it is in connection with these products, round which considerable interest is gathering, that I write these notes.

Professor Eykman, and Messrs. Bertram and Gilde-meister of the firm of Schimmel & Co., have both obtained volatile oils, the former from fresh, the latter from dried leaves, but in neither case was the product obtained in two separate portions of different specific gravity. My experiments were performed in June, 1885, when 152 pounds of fresh leaves of mixed quality, as obtained in the market, by being distilled in several portions, using the same original water throughout, yielded me 3 fluid-ounces of oil of specific gravity (without correction) 1.039, and 2½ fluidrachms of a light oil, the former sinking and the latter floating on the water of the receiver.

Referring to a failure by Mr. Preble to obtain more than one oil—and that the light one—by distilling 90 pounds of fresh leaves, Mr. Kemp said that it would appear that in January, in the middle of the dry and cold season, the yield of oil is small and consists only of the light variety, while in June, in the hottest weather and at the commencement of the rains, the yield is large and mainly consists of heavy oil.

Eykman reported in November last, in the *Berichte*, the results of distilling a large quantity of Javanese leaves. The result was a proportionately very small quantity of volatile oil, clear, pale, greenish-yellow color, becoming golden-brown by exposure to air; with the aroma of the leaf, a burning but agreeable taste, recalling mint or lemon, but somewhat like creosote. It was lævo-rotatory (—3.5 for 200 Mm. by sodium light); s. g., 0.959 at 27° C. Shaken with KHO solution, about one-third was dissolved, with gradual assumption of brown color, and from this solution diluted sulphuric acid precipitated a brown phenol. For purification this phenol was redissolved in KHO solution, shaken with ether (removing a small amount of oil of a pronounced mint taste), reprecipitated with acid, and dissolved in ether, which now left a little brown resin. The ethereal solution, after washing with water, was evaporated, and the residual phenol fractionally distilled. Finally, the product distilling at about 237° C. was considered a pure phenol, and to this substance, constituting the main bulk of the phenolic liquid, Eykman gave the name of *chavicol*.

Chavicol is a colorless liquid of a creosotic odor, soluble in alcohol, ether, chloroform, petroleum ether, KHO solution, and very slightly in water or ammonia. Trials of its antiseptic powers upon gelatin cultures showed that it is about five times more efficient than phenol, and twice the strength of eugenol as a bacteria poison.

For further particulars regarding the constituents of betel leaves, consult a paper by D. S. Kemp in the *Pharmaceutical Journal* of March 15th (from which the above is extracted), or Eykman's paper above referred to.

The Future Supply of India-Rubber.

THE following account is taken from *Industries* (8, 187):

The work of collecting the crude rubber juice in Brazil has been left till recently to ignorant natives, who have destroyed millions of trees either by cutting them down or by their injudicious system of tapping. Latterly, however, the province of Amazonas has passed laws to regulate the season for tapping trees, and awarded premiums to encourage the planting of new forests.

Some twenty years ago the importance of the question of

* On Betel and betel-chewing compare also: Dr. L. Lewin, "Ueber Areca Catechu, Chavica Betle, und das Betelkauen." 8vo, Berlin, 1890.

the future supply of rubber was recognized by the British government, and James Collins, of Edinburgh, was instructed by the India Office to draw up a report concerning the rubber trees of America, and to ascertain whether they could be grown in India. The results of his investigations were published in 1872. In 1875 Robert Cross, of Liverpool, in concert with C. R. Markham, of Assam, went to Panama to collect seeds and cuttings of the Central American rubber tree (*Castilloa*). He was also sent by the India Office in the following year to Pará to collect information about the Pará (*Hevea*) and Ceara (*Manihot*) trees, which produce the best rubber. The descriptions given in his official report show that he met with formidable difficulties in the course of his undertakings, but he succeeded in his main object. The seeds and cuttings which he obtained were duly sown and planted at Kew, and in due time dispersed over various botanical gardens in India and the colonies. As trees, they are now flourishing at Madras, Calcutta, and Zanzibar, also in Burmah and Ceylon. The great superiority of the Pará rubber (*Hevea*) over all other kinds has insured for it the most attention; but its cultivation has been very much of a failure, notably in Assam and northern India, though not equally so in Burmah and Ceylon. It requires an equable, moist climate without extremes of temperature. The *Castilloa* tree was reported a few years ago to be doing well in Burmah and other places in southern India. Some attempts have been made to grow the West African tree (*Landolphia*) in India. It is a hardy shrub, but takes up a good deal of room, and the quality of its products leads to some doubt whether it would pay for cultivation. The following is a short list of plants producing india-rubber:

Nat. Order.	Genus.	Species.	Locality.
Euphorbiaceæ.	<i>Hevea</i> ...	<i>H. Brasiliensis</i> .	Pará.
	<i>Manihot</i>	<i>M. Glaziovii</i> ...	Ceara.
Artocarpacæ.	<i>Castilloa</i>	<i>C. elastica</i>	Central America.
	<i>Ficus</i>	<i>F. elastica</i>	West Indies.
Apocynacæ....			Assam, Rangoon.
	<i>Hancornia</i> ...	<i>H. speciosa</i>	Java.
	<i>Urceola</i>	<i>U. elastica</i>	Pernambuco.
	<i>Vahia</i>	<i>V. gummiifera</i> ...	Borneo.
	<i>Landolphia</i> ..	Various.....	Madagascar.
			West Africa.
			Mozambique.

The above trees are to be met with in a broad zone parallel to the equator where there is an isotherm of 70° F. Turning from the consideration of trees as they grow in untended nature to those that have been acclimatized, a report in 1881 by Dr. King, of the Calcutta Botanical Gardens, stated that the Ceara tree was the only one that promised good results, while the Pará and the Madagascar had utterly failed. This experience has been confirmed by Sir John Kirk, consul at Zanzibar, who, in one of his official reports in 1882, said that the Ceara (*Manihot*) plants grew very well even in the worst soil, needed no attention, and commenced to yield rubber in five years, though not in a way to be remunerative. In October, 1882, Dr. Trimen, of the Ceylon Botanical Gardens at Peradenya, sent to Kew a sample of the Central American rubber (*Castilloa*) produced from a cutting sent from Kew in 1876. This was examined by an expert, and reported to be of good quality, only deficient in tensile strength, owing perhaps to the immaturity of the tree from which it was taken. Colonial rubber is being received at Kew and submitted for examination, showing that this branch of economic botany is far from being neglected. Of Pará rubber from a Kew cutting grown at Mergui, the first sample was received last season at Kew. As in the above case, it was found wanting in tensile strength, and fell short of the best qualities of ordinary smoked Pará. It remains to be seen whether the excess of its viscous over its fibrous constituents will be corrected in future tappings. It is not only in acclimatizing foreign trees in India that work has been done, but, acting on Collins' report, the India Office has caused denuded districts to be replanted with the indigenous *Ficus elastica*. Already in 1870 there was a plantation of these trees at Chardnar, in the district of Darrang, which covered a space of eighty square miles. This particular area has since been annually increased, and there has been planting in other districts besides.

Resin Soap as an Emulsifying Agent.

MR. H. COLLIER (*Pharm. Journ.*, March 15th) describes the emulsifying properties of a compound formed by boiling yellow resin with a solution of sodium hydrate, which he thinks will prove valuable. A similar compound is present in all common yellow soap. This resin soap he prepared by boiling gently for two hours, in an evaporating dish, 1,800 grains of resin with 300 grains of caustic soda, dissolved in 1 pint of distilled water. Upon cooling, the soap separates as a yellow, pasty mass, which is drained, well squeezed, heated to dryness on a water-bath, and powdered in a mortar. Made in this way the soap is somewhat like powdered yellow resin; it is soluble in water and rectified spirit; from concentrated solutions prepared by heat, part of the soap separates on cooling, but gelatinization never occurs. The taste is resinous and somewhat

acid. Five Gm. dissolved in water, the solution acidulated with hydrochloric acid, and the liberated resin acids separated by ether, after drying, weigh 4.22 Gm., corresponding to 84.4 per cent of resin. Mercury shaken in a bottle with a solution of resin soap is immediately broken into very minute globules; as long as this divided mercury is kept moist with the solution, it will not run together. Each globule is coated with a layer of soap, which completely prevents it from coalescing with its neighbor. Chloroform shaken up in the same manner is converted into a permanent cream-like liquid. Ordinary soap and tincture of quillaja act in a similar manner upon mercury and chloroform; in fact, this experiment is a proof of the fact that these substances possess the essential property of an emulsifying agent. Resin soap, compared with *sapo durus* and *sapo mollis* B. P., has a more powerful emulsifying effect upon oils, etc., and it possesses also the great advantage of not becoming gelatinous. Compared with tincture of quillaja it appears to give greater viscosity to liquids, so that suspension of the emulsified oil, etc., is more perfect. A solution of coal tar may be prepared on the lines of the B. P. C. formula for *Liq. picis comp.*:

Resin Soap 3 ½
Rectified Spirit..... 1 pint.

Dissolve the soap in the spirit by means of a gentle heat, and then add—

Prepared Coal Tar..... 4 ½

Digest at a temperature of 120° F. for two days, allow to become cold, and decant or filter. This solution poured into water forms a perfect emulsion, which does not separate either upon dilution or standing. In the same way can be prepared emulsion-forming solutions of tar, oil of cade, and balsam of Peru. The fixed oils—cod-liver, almond, olive, and castor—have been emulsified according to the following formula:

Oil..... 1 fl. 3
Resin Soap..... 10 grains
Water..... 1 fl. 3

Dissolve the soap in the water, and shake with the oil. The oil is perfectly emulsified, and there is no separation into layers, even after long standing. It is possible to make an excellent emulsion with only 5 grains of soap, but a separation into a cream and a milky liquid occurs in time. *Oleum terebinthinæ*, *Oleum pinisylvestris*, *Oleum pini pumilionis*, and pure terebene, when emulsified, are miscible with water in any proportion without separation. This emulsive form will, I think, be found very useful for the preparation of inhalations of volatile oils. These emulsions have been prepared according to the following formula, which is of the same strength as *Vapor olei pini sylvest. B. P.*, resin soap taking the place of the magnesium carbonate:

Volatile Oil..... 3 ij.
Resin Soap..... 10 grains.
Water..... sufficient to produce 8 fl. 3

Dissolve the soap in the water, and shake with the oil. Creosote requires double the amount of soap for perfect emulsification compared with the above volatile oils.

Spirit of camphor containing 5 grains of resin soap in each fluidrachm can be mixed with water, and the camphor remains perfectly suspended. Tincture of tolu with the same quantity of soap is also miscible with water in the same manner. Thymol prepared as follows does not separate on the addition of water:

Thymol..... 18 grains.
Rectified Spirit .. 8 fl. 3
Resin Soap... 20 grains.
Water..... sufficient to produce 8 fl. 3

Dissolve the thymol and soap in the spirit, add the water, and shake together.

Oleum santali and *copaibæ* are emulsified thus:

Copaiba..... 1 fl. 3
Resin Soap.... 10 grains.
Water..... sufficient to produce 1 fl. 3

I have now given a sufficient number of examples to show that resin soap does possess valuable emulsifying properties which, for certain purposes in pharmacy, may be found useful.

Estimation of Alkaloids in Coca Leaves.—Von der Mark recommends the following method: 50 Gm. of the powdered leaves and 20 Gm. of magnesia are moistened with a little water, dried at 60° C., and exhausted with ether. The ether is removed by distillation, and the residue treated with 2 per cent hydrochloric acid; after filtering, the filtrate is shaken with a little ether, just sufficient to remove the coloring matter, ammonia in excess is now added, and again ether. This last operation is repeated three times, employing 25 C.c. of ether each time. The ethereal liquids are mixed, and freed from the small quantity of water they may contain by the addition of some fragments of fused calcium chloride. Finally the ether is removed by evaporation, and the residue dried and weighed.—*J. Chem. Soc.*

Glycerites of Ferrous Salts.

THE liquid preparations of ferrous salts, such as syrup of iodide of iron, have always been a source of trouble to the pharmacist from the facility with which they absorb oxygen and become cloudy, the iron changing to the ferric state. Mr. Arthur has recently pointed out that glycerin, as is well known, has the property of preventing oxidation of ferrous salts, and even of reducing ferric salts to the ferrous state. The sweetness of glycerin also enables it to be substituted for syrup. He is of opinion that glycerites of iodide and bromide of iron might be usefully made thus:

Glyceritum ferri iodidi.—Iron 1 ounce, iodine 2 ounces, water 3 fluidounces, glycerin 27 fluidounces, or a sufficiency. Mix 2 ounces of the water with an equal volume of glycerin in a flask; in this mixture digest the iodine and iron, heating slightly, and occasionally shaking until the froth becomes white; then filter the liquid into 26 fluidounces of the glycerin, rinse out the flask and iron wire, and wash the filter with the remaining ounce of water, mix and make up to 31 fluidounces. The specific gravity should be about 1.300. This glycerite contains 4.3 grains of ferrous iodide in a fluidrachm. A similar preparation is proposed for the glycerite of bromide of iron: Iron 270 grains, bromine 540 grains, water 3 fluidounces, glycerin 26 fluidounces. It is possible that only a portion of the sugar might be replaced by glycerin with quite as good a result. In the latter preparation each fluidrachm contains no less than 5 grains of bromide of iron.—*Monthly Magazine*.

On Belladonnine.

THE name belladonnine is applied to the syrupy mother liquid which is finally left behind after atropine has been made to crystallize out as far as possible. It is a mixture containing:

Belladonnine proper,
Atropine,
Hyoscyamine,
Hyoscyne (18 to 20 per cent),
and of their products of decomposition, viz.:
Tropine,
Pseudotropine,
Tropic acid.

E. Dürkopf has recently studied the nature of this complex substance, and it is he who ascertained the presence of hyoscyne therein. The crude belladonnine is first acidulated, then treated for a number of days with ether and chloroform, for the purpose of removing certain hydrocarbons and other impurities. After the base has thus been purified, the atropine is caused to split into tropine and tropic acid by the usual methods, whereupon the hyoscyne and belladonnine are left behind in solution. The former is easily isolated by converting it into the double gold salt.—After *Ber.*, 1889, 3, 183.

This new source of hyoscyne is likely to diminish its cost.

Chloralimide.

ATTENTION has recently been called to the possible value, as a medicinal agent, of chloralimide: $\text{CCl}_3-\text{C} \begin{cases} \text{H} \\ \text{NH} \end{cases}$, a substance that must not be confounded with that recently introduced as "chloralimide," which is more correctly designated chloral formamide (*Compt. Rend.* 109, 817). Chloralimide was first described by Messrs. Pinner and Fuchs, who obtained it by the action of ammonium acetate upon chloral hydrate (*Berichte*, x., 1068); but Messrs. Behal and Choay now claim that it can be obtained in a state of greater purity as a residue from the action of heat upon chloral ammonia. The product so obtained is described as forming long, colorless and tasteless needles, slightly soluble in water, rather soluble in alcohol, and very soluble in ether.

It is very stable, not being altered by air, light, or moisture, or by heating in a sealed tube to 150° C. in the presence of water, but at 180° it is said to be decomposed into chloroform and formamide. In contact with a liquid acidulated with a mineral acid, it is stated to be decomposed into chloral and the corresponding ammonia salt, but this reaction does not occur with organic acids (*Répertoire*, March 10th, p. 109). Further, it is affirmed that in doses of 0.25 to 0.50 Gm. chloralimide has been ascertained to possess remarkable antipyretic and analgesic properties. M. Choay also claims that it would surpass chloral ammonia or chloral formamide in activity, since an equal weight would yield more chloroform than either; whilst it presents the advantage of being stable and free from unpleasant taste and odor.

Mr. Ritsert, referring to this substance (*Pharm. Zeit.*, March 15th, p. 166), points out that the name applied to it, chloralimide, is not free from objection, since chloral, as an aldehyde, is characterized by a hydroxyl group which is no longer present in this compound.

He thinks it would be more scientific to speak of it as trichlor-ethyliden-imide. Further, the statement that the compound is split up, by heating to 180°, into chloroform (CHCl_3) and formamide (HCONH_2), and by mineral acids

into chloral and ammonia salts, is considered by him to be in contradiction to what is known of the decomposition of chloral, and he thinks proof is required that the compound so described corresponds to the formula attributed to it or is identical with the chloralimide prepared by Pinner.—*Pharm. Journ.*

Iodate of Calcium as an Antiseptic.

FROM a paper on the above subject, by W. Dunnett Spanton, in the *Provinc. Med. Jour.*, we take the following portion:

Iodate of calcium was formerly little known, and I found difficulty in obtaining it from the chemist, who more than once sent me iodide of calcium in its stead. Fortunately for me and for the subject of my experiment, I knew the difference between them, and discovered the error before using it; for the iodide is a comparatively poisonous salt, and in small doses will produce very unpleasant effects. Of this I had been warned by my friend Mr. Sonstadt, and any one intending to use iodate should make quite certain that he does not get iodide instead. My experiments confirmed to a large extent those described by Mr. Sonstadt, and I have now in my possession several of the specimens I put up seventeen years ago.

One, a bottle of fresh urine, to which a small quantity of iodate of calcium was added, has now no odor except that of iodine, whereas the fellow-specimen without the iodate is, of course, putrid. Another, containing some boiled meat, is quite devoid of any odor of putridity; its fellow is intolerable. About the same period a patient brought to me a specimen of lumbricus in water, and to this I added a few grains of iodate and put it aside. After a time it became almost the color of iodine water; then it would become clear again, become dark again, and it is now clear, smelling strongly, and only of iodine. The worm is more or less disintegrated, but the fluid is clear and has never at any time had the slightest putrid smell.

One curious property which the salt has is that of retaining urine clear when added to it while fresh. Acting upon this knowledge, I employed it in some cases of chronic cystitis, in which the urine was very offensive, with excellent effect. When used for washing out the bladder, and given by the mouth in these cases, it had the effect of clearing the urine and greatly diminishing the fetor, though I found boracic acid, on the whole, more efficient, and have generally used it on that account.

As a dressing for wounds of all kinds, for recent amputations and injuries, as well as for suppurating or sloughing wounds, it certainly is useful as an antiseptic. My experience of it in these cases led me to the conclusion that its insolubility (requiring about 400 parts of water for solution) was a drawback, as that strength is not enough to produce a sufficiently prolonged effect upon the discharges to keep them antiseptic. Although one could use the powder itself, I think its action is too slow for its full effect to be realized. I find, in some notes I published nine years ago on excision of the tongue, a solution was found to have an excellent effect as a wash for the mouth, and four days after operation no fetor could be observed in the breath (*Lancet*, 1881, vol. i., page 911). With its internal use I was never able to convince myself that it had any marked effect, except in cases, such as I have referred to, where there was cystitis or a superabundance of lithates in the urine. It occurred to me that its marked effect upon the condition of the urine might render it useful for uric-acid calculus, and I gave it in some cases of renal calculus with this view. I am not able, however, to say that any well-marked effect was observable. Knowing the action of lithium on the uric-acid diathesis, it might be found that, if an iodate of lithium is procurable, it might prove an active and useful drug for this affection.

So far as my experience has gone, I found the insolubility and the slowness of its action the chief drawbacks to the utility of iodate of calcium as a surgical application; but its innocuous and unirritating properties, and its marked effect upon the renal secretion, indicate a special advantage in its use for such cases as cystitis, nephritic abscess, and for renal operations generally. So many of our best antiseptics are poisonous, or irritate, or stain, that it is useful to have one such as this which is free from those drawbacks. It has at least the merit of being inodorous and almost tasteless, and of not disguising other odors by a still worse one of its own.

Presence of Mercury in a Dislodged Tape-Worm.—Ludwig Oelkers reports that he has had occasion to examine pieces of a tape-worm which had been discharged by a person treated for syphilis by mercurial inunction, about 6 av. oz. of mercurial ointment having been rubbed in at various times in the course of a year. The peculiar gray tint noticed in the joints of the tape-worm attracted attention, and excited suspicion of the presence of mercury therein.

The writer was able, by appropriate manipulations, to separate a globule of mercury from several segments of the worm, but did not determine the form in which the mercury existed in the parasite.—*Berichte*, 1889, 3316.

Partridge Poisoning.

IN the provinces of the Dominion of Canada cases of partridge poisoning are not infrequent, but medical attention has been little bestowed upon their symptomatology and treatment. The Nova Scotia Branch of the British Medical Association discussed the subject at its January meeting. The *Maritime Medical News* reports the remarks of Dr. Campbell, of Halifax, who had found the cause of the poisonous state of the flesh of the birds in the ingestion by them of the leaves and seeds of the *Kalmia angustifolia*, or "sheep laurel," also known as "lambkill." Both the leaves and the seeds are poisonous. After eating of this plant, sheep will foam at the mouth, and lambs become convulsed and may die. In regard to the effects of the poisoned partridge flesh upon the human heart, Dr. Campbell could not agree with the prevailing belief; he had not found the pulse so weak and slow as some had reported. It has been stated by some that the pulse has been rendered so extremely weak and slow as to be imperceptible. The treatment of partridge poisoning should be with stimulants by injection and by the mouth, preparations of ammonia, alcohol, etc., with heat applied to the feet and warmth to the body generally. There is commonly no need for an emetic, since the poison itself tends to produce free vomiting.—*N. Y. Med. Jour.*

Californian Honey.

A REVIEW of the 1889 honey crop, lately received from San Francisco, states that last year the crop has not been as large as in 1888; but nevertheless sufficient quantities have been produced so that no scarcity has been felt during the season, and even now there is sufficient honey on hand, as the demand for export has not been active. It is impossible to name exactly the quantity of extracted and comb honey produced in California, but the crop in California for 1889 may be estimated at 2,000,000 pounds of extracted honey and 200,000 pounds comb honey. In 1888, California produced 3,500,000 pounds; 1887, 1,200,000 pounds; 1886, 5,000,000 pounds; 1885, 1,250,000 pounds; 1884, 9,000,000 pounds, or an annual average of nearly 4,000,000 pounds. It is difficult to approach again the amount produced in 1884, for the reason that a great deal of land is now cultivated, so that the bee-stands had to be removed further back into the mountains, and some apiarists have given up this industry, as they have found other occupations more profitable. The prospect for the coming season is so far a very good one. There has been an abundance of rain, and if there should be some rains again in March or April to keep the different kinds of trees and flowers in blossom, there will probably be a larger yield of honey than there has been since 1884. But a great deal depends upon the weather during the honey-producing months, which are, in particular, May, June, and July.—*Journal of Commerce.*

A New Test for Glycerin.

IN the following qualitative test for glycerin, advantage is taken of two characteristic reactions:

1. The formation of acrolein by the distillation of glycerin with acid potassium sulphate, according to the equation:



2. The red coloration produced in a solution of rosaniline, decolorized by means of sulphur dioxide, by acrolein, as by aldehydes (Schiff and Caro's reaction).

To carry out the test, the solution containing the glycerin is evaporated down to about 5 to 10 C.c. in a small porcelain dish, about 1 Gm. of powdered acid potassium sulphate added, the whole well mixed together and then brought to dryness on the water bath. The residue is transferred to a hard glass tube, 3 to 4 inches long, fitted with a cork and exit tube, the latter passing into a test tube containing water. On heating the tube, the acrolein is readily evolved, and is dissolved by the water in the test tube. The contents of the latter can be tested for the presence of an aldehyde in the usual way by the addition of a few drops of Schiff's reagent. Both before and after the addition of the reagent, the solution in the test tube should be well shaken; the color only develops slowly, and reaches its maximum after fifteen to twenty minutes' standing. If the aqueous solution happens to have got warm by the condensation of steam evolved during the distillation, it must be cooled before adding the reagent, since the latter turns red on warming in the absence of an aldehyde.

The delicacy of the reaction has been tested by Mr. J. T. Conroy and Mr. B. W. Jones, with the result that it is possible to detect 0.15 Gm. of glycerin in this way, or, in round numbers, 1 part of glycerin in 650 parts of water by evaporating down 10 C.c. of the solution, and therefore 1 part of glycerin in 6,500 parts of water by evaporating down 100 C.c.

The reaction is not given by any of the following substances: Mannite, cane sugar, grape sugar, milk sugar, starch, dextrin, albumen, gelatin, stearic acid, and oleic acid; but the carbohydrates interfere with the delicacy

of the test, owing to the fact that their distillation products with acid potassium sulphate hinder the formation of the red color with the rosaniline solution. To carry out the test in presence of sugar, the latter must first be removed by evaporating the solution in the presence of calcium hydrate and sand, or of calcium hydrate and calcium carbonate, and extracting the residue with a mixture of 2 parts of alcohol and 1 part of ether. On evaporating the extract with acid potassium sulphate, and distilling the residue, the reaction is obtained as above; but it is not possible to detect less than 0.03 Gm. of glycerin in the presence of much sugar, or 1 part of glycerin in 3,300 parts of water by evaporating down 100 C.c. of the solution.

The reaction must be similarly applied in testing for glycerin in wine and in beer; the limit of its delicacy in these cases is the same as above. In testing milk for glycerin, the casein, albumen, and sugar should be first removed.

Fatty acids do not interfere with the delicacy of the reaction. Compared with other color reactions for glycerin, this test appears more characteristic, though not quite so delicate as Reichel's phenol test.—Abstract of paper by CHAS. A. KOHN in *Jour. Soc. Chem. Ind.*

Morphine Salts and Hydrocyanic Acid.

PROF. J. M. MAISOH calls attention to an item lately going the rounds of pharmaceutical journals which declares a mixture of morphine with cherry-laurel water to be incompatible and dangerous to life. He says: "In a paper published in the *American Journal of Pharmacy* in June, 1871, page 258, I stated that hydrocyanic acid does not precipitate neutral solutions of morphine. The same paper details some experiments made by me with neutral salts of morphine and alkali cyanides, which were shown to precipitate the morphine so completely that the filtrate will yield no further precipitate with potassium-mercuric iodide. The crystalline precipitate I supposed to consist of morphine hydrocyanide, but Prof. Flückiger subsequently showed that under the conditions mentioned the alkaloid morphine is precipitated, and that a morphine cyanide does not exist. The error in the above statement can only be explained by the improper preparation of the cherry-laurel water used. If made by distillation from the leaves, it cannot contain a cyanide, and the free hydrocyanic acid will not cause a precipitate. Very likely the water was prepared by means of magnesia, in which case it must have contained magnesium cyanide, which would precipitate morphine. It is proper to add that in the paper quoted (*N. Jahrb. f. Pharm.*, No. 38, page 138), Prof. Flückiger also shows that berberine, quinine, cinchonine, and strychnine likewise do not form cyanides under similar circumstances."—*Amer. Jour. Pharm.*

Estimation of Quinine in Mixtures.

IN the course of a paper on "The analysis of medicines dispensed from physicians' prescriptions, and a rapid method of estimating quinine in medicine," by Dr. Seaton and Mr. H. D. Richmond (published in the *Analyst*, 1890, 42), we take the portion particularly relating to quinine:

Certain objections to the general adoption of the ammonia and ether process have led us to the suggestion of the following method, which we found to be perfectly reliable within certain limits, and which has the advantage of being rapid and inexpensive. We do not recommend it in substitution of the ammonia and ether process, as the final method of determining the proportion of quinine in medicine, but as a preliminary process which will enable the analyst to decide whether an error in dispensing has been committed sufficient in extent to bring the case within the scope of the Adulteration Act. We have found that quinine bisulphate is neutral to methyl orange, while the base itself has no action on phenolphthalein; and we have, bearing these facts in mind, adapted to the termination of quinine the method of alkalimetry.

We prefer to operate as follows:

To 25 C.c. of medicine add 2 drops of methyl orange (25 Gm. in 1 liter of water) and 2 drops of phenolphthalein (5 Gm. in 1 liter of 50-per-cent alcohol), titrate with one-tenth normal baryta solution until the free acid is all neutralized, which is shown by the red color just changing to brown. Note the number of cubic centimeters used. Continue titration until the pink color of the phenolphthalein appears. Care must be taken not to overstep this last point, as the color does not develop quite immediately. The difference between the two titrations, multiplied by the factor 0.218, gives the weight of the quinine sulphate (i.e., the salt with 7 molecules of water) in grammes in the 25 C.c. The number of cubic centimeters in the medicine prescribed is known, and the calculation becomes a simple proportion.

The method is, of course, not applicable in the presence of salts of which the base is precipitated by baryta.

The following is the result of the estimation of quinine in the same medicines by the volumetric and gravimetric processes respectively. Four samples of medicine were

obtained in the usual way, and it will be seen that the results of the two methods closely correspond :

	Volumetric.	Gravimetric.
1.....	21.2	20.8
2.....	23.4	23.2
3.....	16.5	16.1
4.....	20.3	20.0

We have further tested the process in the following way : Solutions of quinine, accurately prepared, were obtained by one of us from Messrs. Bell & Co. Solution A contained 12 grains by weight of Howard's quinine sulphate; solution B, 20 grains; solution C, 18 grains; and solution D, 15 grains. Four samples of each solution were obtained, and they were submitted to the other for estimation by our process.

The process gave the following results :

A (12 gr.) found respectively	12.1	12.2	11.8	12.0
B (20 gr.)	19.7	19.9	19.9	19.7
C (18 gr.)	17.5	17.6	17.5	17.8
D (15 gr.)	15.4	14.7	14.9	15.2

Reactions and Tests of Phenacetin.

SOME time ago Mr. J. Luettke proposed several new reactions and tests by which the identity and purity of phenacetin could be more fully established.

When phenacetin (15 Gm.) is boiled for a considerable time with diluted hydrochloric acid (25 Gm.), the former is decomposed and converted into hydrochlorate of amidophenetol. The latter yields a blood-red color with ferric chloride, and this may be used as an identity reaction for phenacetin, thus:

Upon boiling phenacetin with diluted hydrochloric acid, and afterwards adding ferric chloride, the liquid must acquire a blood-red color.

To prove the absence of diamido compounds, a small portion of the substance is brought into contact with nascent chlorine. This is best done by triturating about 0.5 Gm. of chlorinated lime with a little hydrochloric acid to a thin paste, and then adding about 5 grains of phenacetin. If any diamido compounds are present, there will be a color (blue, violet, etc.) developed; if the phenacetin was pure, the mixture will remain colorless.—*After Pharm. Centralh.*

Test for Cottonseed Oil in Lard.

MR. FRANK P. PERKINS makes the following communication to the *Analyst* (1890, 51):

The following may be used in sorting samples of lard which have to be examined for cottonseed oil:

I find that if a little powdered potassium dichromate, about 0.2 to 0.3 Gm., be mixed with a few drops of concentrated sulphuric acid in a porcelain dish, and a small portion, about 5 Gm., of the suspected sample be then introduced, on stirring well a second time, adding water, and stirring again, there will, in the presence of cottonseed oil, be developed a green color, due to the change of chromic acid to chromic oxide; but if the vegetable oil be absent, the yellow color of the dichromate will still prevail. The color should not be judged until water has been added and the mixture stirred for some seconds.

This test I have tried with samples of bladder lard, the same containing a certain proportion of cottonseed oil, and with cottonseed oil itself. It has not failed to detect the cottonseed oil, either alone or when mixed with lard. How the test is affected by other vegetable oils I have not yet determined; I therefore submit it with diffidence, and should be glad to know how it answers in the hands of other experimenters.

The Analysis of Carbolic and Sulphurous Disinfectant Powders.

FROM a paper on this subject by Dr. John Muter, read at a recent meeting of the Society of Public Analysts, we take the following (after the *Analyst*, April, 1890):

The ordinary *cresol* of commerce usually contains some naphthalene (naphthalin), and a rapid method of getting a fairly accurate idea of its amount is a desideratum. This presence of naphthalene is often preferred by the purchasers, who have the idea that if "commercial carbolic acid" becomes milky when put into water, it shows its strength. The process I have devised is as follows:

Fifty C.c. of the acid are shaken up with 200 C.c. of 10-per-cent solution of sodium hydrate, when the acids readily dissolve, leaving the naphthalene floating on the top. The bottom liquid layer is run off, a washing of 5-per-cent solution of sodium hydrate is put on, and the whole is rapidly filtered through a quick filter and allowed to drain. The collected naphthalene is rinsed off the filter into a small beaker with water, and is then once more collected on a pair of counterbalanced filters in the usual manner. After draining, the filters are removed from the funnel and dried as far as possible between blotting paper by judicious pressure. The filters are separated, and the inner one and its contents are weighed, using the outer one as a tare. The amount of moisture held by the two filters is

sufficiently alike to enable us to get a very fair approximation of the true amount of naphthalene, quite near enough for ordinary purposes.

Taking now the analysis of *sulphurous* powders, the process I use for the estimation of the available sulphurous acid is as follows:

Two Gm. of a fair sample of the powder are placed upon a small filter and percolated with anhydrous ether until the phenols and tarry matters are removed, which is readily and quickly attained. Fifty C.c. of decinormal iodine solution are then placed in a bottle, and as soon as the ether has dried off from the powder, the contents of the filter are dropped into the bottle. The bottle is allowed to stand for half an hour (being shaken at intervals), and finally the contents of the bottle are titrated back with decinormal "hypo" in the usual manner. The amount of iodine destroyed, of course, represents the available sulphurous acid in the 2 Gm. of powder started with, and, therefore, it is only needful to multiply the number of cubic centimetres of iodine used by 0.0032. This method I find to work well with every sort of powder in the market, provided its base be not lime. To get a really satisfactory process in the presence of a lime base is very troublesome, and I cannot say that I have yet met with one that is at once rapid and good.

We come now to the important question of "reversion." Sulphurous powders oxidize with great rapidity, and a perfectly honestly manufactured one may, if badly kept for even a very short time, show on analysis a much smaller portion of available sulphurous acid than it ought to do. It is, therefore, the duty of an analyst desirous of holding the scales of justice fairly, to try, if possible, to ascertain the amount of such reversion. With a powder made on a gypsum base and with calcium bisulphite I am not aware that this is attainable; but many of the leading makers, recognizing this, are so constructing their powders as to render it possible. Some use a purely silicious base, containing only a neglectable quantity of sulphate, while others use a gypsum base but put in the sulphite in the form of a specially manufactured sodium salt. It would at first sight appear that the analysis of such a powder is a very simple matter, but this is not so. The whole thing is complicated by the fact that the moment water is put upon the powder a double decomposition occurs, and we get insoluble calcium sulphite and sodium sulphate, and we find in practice nearly the whole of the sulphurous acid in the insoluble residue. To get at the reversion in such powders I have devised the following method:

Twenty Gm. of the powder are put into a bottle, and 200 C.c. of water are measured in with a pipette. After an occasional shake the whole is allowed to settle, and some of it is poured off or filtered through a dry filter. The decomposition above alluded to often occurs at this stage of the process; but, as will be seen, the latter is not thereby affected. Twenty C.c. of the liquid (equal to 2 Gm. of the sample) are mixed with an excess of bromine, and filtered from any bromo-cresol remaining undissolved. It is then treated with an excess of barium chloride, and the total sulphuric acid is weighed as barium sulphate. As, however, a part of this is due to dissolved calcium sulphate, another 20 C.c. are precipitated with ammonium oxalate, and the lime weighed as carbonate. The calcium thus found is now calculated to its equivalent amount of sulphuric acid, and this is deducted from the total. The remainder is still further reduced by deducting an amount of sulphuric acid equivalent to the sulphurous acid previously found by the iodine method, and the remainder represents the reverted sulphurous acid, and is calculated as such.

If the powder be made with a silicious base, it may be more convenient for those who only perform the analysis now and then, and who prefer a gravimetric method, to proceed as follows:

Drop 2 Gm. of the powder into a beaker containing an excess of bromine water, and while this is acting take another 2 Gm., put it into a dish, and moisten with fuming hydrochloric acid (containing no free chlorine). Now evaporate to dryness, redissolve, and then throw down the sulphate with barium chloride in both parts. The difference between the two results calculated to sulphurous acid will give the amount of that body present in the 2 Gm. of sample taken. If the base be all but free from sulphates, we thus get a fair idea of the probable reversion at the same time.

Tri-iodide of Caffeine occurs in the form of green crystals, oblong prismatic in shape, fluorescent, and readily soluble in water and also in alcohol. The formula is $3(C_8H_7N_3O_2I_3) \cdot 3H_2O$. The crystals easily decompose, and in gathering must be washed very carefully with dilute alcohol slightly acidulated with hydriodic acid. The alcoholic solution soon becomes brown and polarizes light exactly as does the iodoquinine sulphate solution, the two substances closely resembling each other in several other particulars. According to Mortimer Granville, the tri-iodide of caffeine is destined to become a very valuable iodine preparation, as it decomposes rapidly in the stomach, and is free from the inherent defects of the alkaline iodine salts and those composed of iodine and quinine.

Effects of a large Dose of Antifebrin.—Dr. Hartge, of Dorpat, reports a case of a student who took between 28 and 29 Gm. (about 420 grains) of acetanilide. There was no loss of consciousness, motion, or of sensation; no albuminuria or hæmoglobinuria, and only a slight jaundice. Although, as in aniline poisoning, the blood became of a dark blue, the corpuscles presented a normal appearance. Respiration was rapid and irregular, and the pulse was quickened. There was insomnia and cardiac palpitation and dyspnoea, with a feeling of impending death. When seen several hours after the drug had been taken, the skin was bluish over the entire surface, and markedly about the eyelids, chin, and temporal regions. There was no puffiness, as in severe asthma, and the general appearance was different from that of cyanosis. Although there had been no previous vomiting, a glass of red wine came up immediately, and was followed by vomiting of bilious matter. Sulphate of soda, coffee, and brandy were given by the mouth, and camphor and ether hypodermatically, with cold to the head. On the third day the patient was up and the blueness had entirely disappeared.—*Br. Med. Journ.*

The New Swiss Pharmacopœia.—This new Pharmacopœia describes about eight hundred medicines, and is published in German, French, and Italian. The various articles are arranged alphabetically according to their Latin titles. The *Pharmaceutische Zeitung* states that amongst the features of the Pharmacopœia are particulars as to what is meant by "powder," beginning from the finest grade, and designating coarser kinds by numbers. The specific gravities of tinctures are given; there are three sorts of extracts (fluid, soft, and dry). Solutions are designated by the word "Solutum," in preference to "Liquor," these preparations occurring in the order of the names of their chief component, as for example, "Kalium aceticum solutum" [—"dissolved acetate of potassium"]. Amongst the new departures are to be noted the preparation of a few syrups from fluid extracts, and the standardization of potent preparations such as extract of nux vomica.—*Chem. and Drugg.*

Sugar-coating Pills.—Hecker's method consists in drying the pills, then moistening them with a little syrup in a saucer, then placing them upon a sheet of paper covered with a thin layer of powdered sugar [this should be what is known as confectioner's sugar.—Ed.], where they are to be rolled about until completely enveloped. They may then be placed upon a hair sieve to remove excess of sugar, and dried without heat (which is liable to crack them). The process may be repeated, if desirable, after another drying. While inferior to machine coating, these pills may, by a little practice, be made very white and round.—*Chem. and Drugg.*

Colored Antiseptics.—Some time ago the Paris Academy of Medicine decided to recommend that midwives be allowed to procure and use a solution of corrosive sublimate as an antiseptic. Subsequently the question arose as to the coloring agent which should be used to give it a distinctive tint. Indigo blue, in definite quantity, has now been selected, so that henceforth, after the Academy's recommendations receive the expected ministerial sanction, pharmacists will be allowed to deliver to licensed midwives, on their written order, powders composed as follows:

Corrosive Sublimate	0.25 Gm.
Tartaric Acid.	1.00 "
Five per cent of Alcoholic Solution of Indigo-	
carminc.....	1 drop.

Mix and dry. Label each paper with the regulation orange-red label, bearing the inscription (French, of course): "Corrosive sublimate, 25 Gms. For one liter of water. Poison." The solution is to be used for antiseptic washes and dressings, and its distinct blue color is meant to prevent its being mistaken for other liquids commonly found in domestic economy. As the law stands at present, pharmacists have no right to give to midwives any poisonous antiseptics.—*Chem. and Drugg.*

Depreciation in the Strength of Jalap.—Prof. Flückiger remarks the loss in strength which jalap has undergone since 1842, when Guibourt found 17.60 per cent of resin, though at that period various samples yielded from 10 to 17 per cent. Nowadays the yield of resin is scarcely more than 12 per cent at best, yet roots bought in the fields around the City of Mexico gave 16.9 per cent of resin. The explanation is said to be that Mexican dealers steep the roots in alcohol, whereby some of the resin is extracted, and, after drying, the appearance of the roots is unchanged. The resin extracted is sold as jalapin, or resin of jalap.

Jalap grown in Germany has yielded as much as 22.73 per cent of resin.

Percolation of Green Drugs.—The *Pharmaceutische Post*, of Vienna, and other pharmaceutical journals, have been calling attention to this subject. One of our contemporaries says: "Green drugs present an obstruction to percolation extraction by the fact that the large

amount of water present in their tissues dilutes the percolate, so that it is impossible to use ordinary spirit for maceration, and prepare a tincture without much evaporation; and if the alcohol is very strong it contracts the tissues, reducing the surface of the plant to the state of a tough, leather-like substance, which quite prevents the rapid circulation of the liquid." There is another most vital consideration to be taken into account, namely, that the strength of the product, that is, the dose, is very much greater than if the dry plant has been used; and with powerful drugs like belladonna or hyoscyamus, etc., this consideration is of paramount importance.

The Uses of Ichthyol.—The therapy of ichthyol is being gradually developed, and the latest authority, Professor Gadde, agrees with others that its use is indicated wherever there are enlarged veins or abnormalities of circulation; hence he recommends it in all skin diseases, in chronic rheumatism, and in nephritis, and describes a case of diabetes where, by internal application of ichthyol, the amount of excreted sugar decreased from 7.1 to 0.5 per cent in a month. The remedy was administered in aqueous solution or in pill form; externally, Gadde used a 50-per-cent ointment with lanolin.—*After Chem. and Drugg.*

Detection of Methylated Spirit of Nitrous Ether.—Mr. John Muter speaks of this as sold in England by cutting stores and oil men, and suggests, as a ready method for its detection, placing some of the suspected spirit in a glass with a lump of solid caustic potash the size of a small bean, and then stirring until nearly dissolved. The genuine B. P. spirit will lose all its odor of nitrous ether, and, after standing for half an hour, will not have turned darker than a pale straw color, when it will have only the odor of plain rectified spirit. The methylated article will become a deep yellow to orange red, and have the characteristic odor of methylated spirit.

Antiseptic Ligatures.—Wrap the E and A violin strings loosely upon glass spools, and, after covering them with ether for twenty-four hours, remove them, thread the spools on to a glass rod, and allow the ether to evaporate, avoiding contact with anything meanwhile. When they are dry, immerse them in a solution of 1 per cent of corrosive sublimate in diluted alcohol; after one-half hour remove them, and wipe the gut with a towel that has previously been washed in a 1-per-cent solution of the corrosive sublimate in water. Place the spools in a bottle containing oil of juniper, where they should be immersed at least ten days before being used.—E. Q. THORNTON, *Amer. Jour. Pharm.* (Thesis).

Gum Ghatti, being the subject of a paper by C. F. Henry, is said by him to produce a mucilage of bland and not unpleasant flavor. Only 75 per cent of the gum is soluble in water, even with a boiling temperature; the residue increases considerably in bulk, however. A 1:3 mucilage is of greater density than a B. P. mucilage of gum arabic, and possesses much greater adhesive properties. As regards cost, an ounce of ghatti gum produces about twice as much mucilage as a similar amount of acacia and at one-twelfth its cost.

Salicylate of Sodium, when added to spirit of nitrous ether or solution of acetate of ammonium, has been found to give a dark reddish discoloration, and Prof. Charteris, of Edinburgh, has ventured an opinion that it may be owing to impurities contained in the artificial salicylic acid. Mr. C. F. Henry has made some comparative experiments with the artificial and natural acids, and finds the discoloration much more decided in the case of the latter. The color formed more quickly, becoming, with the spirit of nitrous ether, at first olive green and then reddish brown, or, with sal volatile, at first reddish and then dirty brown.—*Pharm. Jour.*

Japan Wax.—The preparation of vegetable wax is one of the principal industries of the island of Kiu Siu. The wax is gathered in the most primitive manner from the berries of the *Rhus succedanea* (Hazenoki tree). In some districts hydraulic presses have been introduced for its preparation, but the result has not been satisfactory. The best wax is produced in Kumamoto, but does not appear in commerce, as it is all sent to the imperial court. The best commercial wax is made in the province of Hizen, and brought into commerce via Osaka. The traders in that place are better capable of purifying and bleaching the wax than the peasants in Kiu Siu. In Japan the wax is largely used for candles and in the preparation of hair ointment.—*Brit. Cons. Rep.* (*J. Soc. Chem. Ind.*).

Detection of Free Chlorine in Hydrochloric Acid.—According to Kupferschlaeger, pure concentrated hydrochloric acid diluted with one-fourth its volume of water does not attack granulated copper until heated at 200° C., but slight traces of chlorine determine the solution of the metal in the cold, with consequent coloration of the acid.

Although pure hydrochloric acid has no action on phosphorus, in the presence of free chlorine an action obtains, and the solution produced gives a coloration and precipitate with ammonium molybdate.

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EDITORIAL.

ONE of the burning questions connected with the present revision of the U. S. Pharmacopœia is undoubtedly that of standardization of preparations derived from vegetable drugs. Though it is quite likely that this number of our journal will not reach many of its subscribers before the matter has been discussed and decided by the Convention, yet we anticipate that this decision will leave a large share of responsibility and discretion with the Committee of Revision, in so far as to leave it at liberty to prescribe definite standards only in such cases in which our present methods of assay are capable of furnishing positive proofs not only of the *quantity* but also of the *quality* of the proximate principles which the respective drugs are known to contain, and upon which their therapeutic properties depend. We have already on a former occasion (see our January number) put ourselves on record that we are by no means, from principle, opposed to standardization. On the contrary, we have declared our approval of definite standards, when these can be determined with reasonable certainty and without complicated processes. But a considerable experience in assaying various pharmaceutical preparations made from vegetable drugs has convinced us that we have not yet arrived at a point even half-way to certainty in a great many cases. If an assay, so-called, is to consist of throwing down, for instance, an alkaloid by means of some precipitant, and the strength of the drug in alkaloid is to be merely determined from the volume of the reagent necessary to completely precipitate the principle, we maintain that this is not any surer criterion of its quality or strength than if we were to attempt to estimate the quantity of sulphuric acid or of a sulphate in any aqueous liquid by merely noting the quantity of baric chloride consumed until no further precipitation takes place. Just as much as in the latter case a quantitative determination is absolutely worthless, or at least untrustworthy, unless supported by a qualitative examination, which will enable us to so arrange matters that *nothing but* sulphuric acid can, under the given circumstances, be finally precipitated by the barium salt, so also is a mere precipitation of proximate principles, in a liquid preparation derived from a vegetable drug, without any positive value unless it can be shown that the

substance precipitated by the reagent has actually pre-existed in the drug, belongs to it, and has not been added, accidentally or fraudulently, to produce the expected precipitate, or at least to produce a precipitate of an expected or required quantity.

It has been argued that the absence of any ready means of combining reactions of identity with alkaloidal assays need not be regarded as an objection to the employment of the latter, inasmuch as it should not be assumed, *a priori*, that a pharmaceutical preparation has been fraudulently manipulated. Yet, after all, what is an assay for? Evidently to enable one to arrive at a safe conclusion regarding the quantity of some *definite* substance. We fail to see how any positive or reliable conclusions can be based on an assay where the *nature* or *identity* of the substance remains unknown or can be established only by tedious, elaborate, and expensive processes.

While we believe that the establishment of definite standards, to be determined by so-called assays, would, at the present time, be premature, we do not doubt that it will become possible in the future. It will require a number of years of careful study to work out processes which will be reliable, free from tedious complication, and satisfying every requirement. If the Convention of 1890 should adopt a resolution instructing the Committee of Revision to provide standards of strength and to establish methods of assay for vegetable drugs and their preparations, the Committee might not find it possible to carry out the instruction, or it might possibly result in the introduction of methods of assay which will shortly be shown to be unreliable. This would, of course, be worse than not to introduce them at all.

It seems to us wisest, at the present time, to go ahead slowly in this matter, but to keep the goal in view, so that at the next revision (in 1900) there may be a fair prospect of coming before the profession with something that is trustworthy and free from objections.

In the present revision, one important step might well be taken, namely, to state (merely as a matter of information, but not of requirement) in connection with such drugs, where it may be deemed advantageous, that, when of good quality, it contains a certain stated quantity (or certain upper or lower limits) of alkaloid or other principles, and to give in connection therewith a process of assay. If then any one wishes to apply this process of assay to any preparation made from the drug, he may do so, but there should be no compulsion to make the preparation of an *exact* strength at this revision, except in the case of Opium, Nux Vomica, Cinchona, and a few other drugs where it is not difficult to establish the identity of the final product.

If the physician is anxious to adopt an exactly standardized preparation representing such drugs as Coca, Pilocarpus, Conium, Physostigma, etc., and he has no confidence in the usual pharmaceutical preparations (fluid extracts, tinctures, etc.) derived from these drugs, all he need do is to employ solutions of the respective alkaloids—cocaine, pilocarpine, coniine, physostigmine—or of their salts. Up to the present time the recorded experience of the medical profession, so far as pharmaceutical preparations of the above drugs are concerned, has been mainly based upon the usual commercially available brands of fluid extracts, tinctures, etc., made without assay, and yet a pretty unanimous opinion has been arrived at regarding the proper doses in which these preparations should be given to attain a certain object.

THE Seventh Decennial Convention for Revising the Pharmacopœia met in Washington on Wednesday, May 7th, and continued in session until Friday at noon. Although the number of bodies accredited with delegates was larger than ever before, the actual attendance was not much greater than in 1880, the notable difference being the preponderance of the pharmaceutical element. Much delay was caused by the neglect of many bodies to send credentials to the president of the former convention, in compliance with his call, and it was not until Thursday morning that the convention finally elected its officers and appointed its Committee of Revision, as follows: President, Horatio C. Wood, M.D., of Philadelphia; Vice-Pres-

idents, W. S. Thompson, D. W. Prentiss, M.D., and J. M. Flint, M.D., of Washington, A. E. Ebert of Chicago, and J. W. M. Searby of San Francisco; Secretary, H. A. Hare, M.D., of Philadelphia; Assistant Secretary, G. H. C. Klie, of St. Louis. For Committee of Revision, Charles Rice, Ph.D., of New York (subsequently elected chairman); Prof. James P. Remington, of Philadelphia; Prof. F. B. Power, of Wisconsin; Prof. P. W. Bedford, of New York; Dr. W. M. Mew, of the Army; Dr. John Godfrey, of the Marine Hospital Service; Dr. J. M. Flint, of the Navy; Prof. J. M. Maisch, of Philadelphia; Prof. Roberts Bartholow, of Philadelphia; Prof. C. O. Curtman, of St. Louis; Dr. F. A. Castle, of New York; Dr. N. S. Davis, Jr., of Chicago; Prof. C. Lewis Diehl, of Louisville; Dr. R. G. Eccles, of Brooklyn; Dr. W. G. Gregory, of Buffalo; C. Mohr, Ph.D., of Mobile; Prof. G. F. H. Markoe, of Boston; Prof. Oscar Oldberg, of Chicago; Prof. L. E. Sayre, of Kansas; Prof. Otto N. Wall, of St. Louis; Dr. Thomas F. Wood, of Wilmington, N. C.; Prof. H. H. Rusby, of New York; A. B. Taylor, of Philadelphia; Dr. R. T. Edes, of Washington; Prof. C. S. N. Hallberg, of Chicago. The president, Dr. Horatio C. Wood, was afterwards made a member *ex officio*.

The final report of the Committee of Revision and Publication was, in the main, as follows:

Immediately after the close of the Convention the Committee organized by electing officers, and a second meeting was held before the members left Washington. At these meetings the general plan for carrying on the work of revision was discussed and a number of preliminary details settled. As it was impossible to hold frequent meetings, owing to the distances separating the members of the Committee, it was decided to carry on the interchange of discussions and arguments, and the voting on motions and propositions, by means of circulars.* There being no funds at the disposal of the Committee of Revision for paying its current expenses, a proposition made by the Finance Committee to borrow \$1,200 for eight months was adopted. This loan was subsequently reduced to the sum of \$800 and extended for six months longer.

In September, 1880, a third meeting of the Committee was held at Saratoga, at which Albert M. Prescott, M.D., of Ann Arbor, and Emil Scheffer, Ph.G., of Louisville, were elected members in place of T. G. Wormley, M.D., and Edward R. Squibb, resigned.

Concerning the changes made in the text of the Pharmacopœia, and all other details of general interest regarding the work of revision, a report has already been published in the preface of the Pharmacopœia, pages xxvii., xxviii., reference to which is invited.

When the manuscript of the work was near its completion, the Committee on Copyright, which had meanwhile been appointed, solicited bids for the publication of the work. Six bids having been received in response to this invitation, the Committee accepted that presented by William Wood & Company. After a full discussion their action was subsequently ratified by a majority vote of the whole Committee. The work was then put to press, and was issued to the public during the last week of October, 1882. A vote was passed shortly afterwards that the right to use the text of the Pharmacopœia for purposes of comment be granted to applicants upon such terms as the Finance Committee might deem equitable. Only one publishing house, viz., Messrs. J. B. Lippincott & Co., of Philadelphia, availed itself of this offer, paying a royalty of \$100 for the privilege.

On September 9th, 1882, the Committee lost by death one of its members, Dr. Benjamin F. Gibbs, U.S.N. The vacancy was filled in April, 1883, by the election of D. Webster Prentiss, M.D., of Washington. Previous to this election a plan for filling vacancies in the Committee was adopted, according to which only delegates to the Pharmacopœial Convention should be regarded as eligible. A fourth meeting of the Committee was held at Washington on September 11th, 1883. During the year 1884 the advisability of publishing a supplement, authorized by the last Convention, was discussed. After a careful consideration of the claims advanced in favor of a number of new drugs, chemicals, and preparations, it was decided

that none of them appeared at that time to be equal in rank or value to those already official, and that, therefore, a supplement was unnecessary.

Another serious loss befell the Committee through the death, on August 21st, 1885, of Henry B. Parsons, Ph.C. This vacancy has been allowed to remain unfilled. During the year 1886 the Committee undertook to collect statistics regarding the frequency with which the various pharmacopœial articles were prescribed in the various sections of the country. A table of the official titles was printed, and copies were furnished to those bodies or individuals who agreed to obtain the desired data. While a number of returns have been received, and the thanks of the Committee are due to the contributors, yet it must be stated that the results are only partially of practical use, since most of them apply to the experience of individuals or limited localities. In 1888 it was resolved to make a collection of criticisms on the Pharmacopœia from the literature published since the issue of the work, and the Chairman was authorized to employ an expert to make the compilation. As a result the Committee has published a digest of criticisms on the Pharmacopœia, in three parts, which, it is hoped, will lighten the labors of the next Committee.

By direction of the last decennial Convention this Committee is required to present a complete plan for the revision of the Pharmacopœia at the present Convention. In obedience to this instruction the Committee has, at a final meeting held on May 6th, 1890, deliberated on the general principles which should, in its judgment, be followed in the next revision.

These general principles, submitted in a separate report, were as follows:

Assay Processes for Drugs.—It is recommended that assay processes be appended to the descriptions of the more energetic or otherwise important drugs containing active principles, provided the therapeutic value of the drug depends upon the amount of these principles, and provided also that these principles can be assayed and identified with reasonable accuracy and without requiring complicated processes. The Committee may attach a note stating the usual percentage of these active principles in good commercial samples of the drug, and, if it be found feasible, it may attach a requirement that the drug shall not be used unless it conforms to these stated limits.

Assay Processes for Galenical Preparations.—The Committee may attach assay processes to such galenical preparations as fluid extracts, tinctures, etc., but it shall omit requirements of a definite strength or percentage of active principles except in the case of drugs for which an upper or lower limit, or both, of active principles is prescribed.

Assay Processes for Opium and Cinchona.—In the case of opium and cinchona the Committee shall adopt such processes of assay as will be found to yield the largest proportion of the desired active principles with greatest uniformity and with least manipulative difficulty, the object of these processes being to ascertain how much of the respective principles can practically be extracted.

Descriptions of Chemicals and Tests.—In the case of chemicals the degree of purity, or the allowable percentage of impurity, shall be prescribed as closely as practicable. The standard of purity shall be set as high as practicable for legal enforcement, but not beyond a point reasonably attainable by the manufacturer without subjecting any particular product to unnecessary cost through the enforced removal of some harmless and insignificant accidental impurity.

Chemical Formulæ.—Chemical formulæ shall be given only in the new notation.

Proprietary or Patented Articles.—No substance which cannot be produced otherwise than under patented processes, or which is protected by proprietary rights, shall be introduced into the Pharmacopœia.

Nomenclature.—In the choice of titles of official articles it is recommended that convenience, established custom, and considerations of safety against mistakes, through similarity of or changes in names, should outweigh purely theoretical considerations or scientific preciseness.

Specific Gravity.—It is recommended that the Committee define the exact degree of temperature of the stand-

* In all 252.

ard by which other specific gravities are to be determined, and the specific gravities of the various official liquids shall be determined and stated by the Committee, so far as it may be practicable, on the basis of the established temperature and other conditions of the standard.

Weights and Measures.—It is recommended that the next Committee of Revision be instructed to direct solids to be weighed and liquids to be measured, and that the metric system be employed for this purpose.

General Formulæ.—It is recommended that general formulæ be introduced for fluid extracts, and such other preparations as have duplicate processes, and that the general formula to be followed in any particular case be merely indicated by reference.

List of Reagents, Tables, etc.—The tables and list of reagents authorized or prescribed for the Pharmacopœia of 1880 shall also be inserted in that of 1890, with such corrections or substitutions as may be required to bring them up to date.

Publication of the Pharmacopœia.—It is recommended that the Committee of Revision, etc., which will be elected by the Convention of 1890, be authorized to print and publish, on its own account, the Seventh Decennial Revision of the Pharmacopœia of the United States of America.

Date for the Pharmacopœia to go into Effect.—The Committee shall announce in a conspicuous place, in the printed work, a definite date, reasonably distant from the actual date of publication, when the new Pharmacopœia is intended to go into effect and to supersede the preceding one.

Compensation of Experts.—It is recommended that the Convention of 1890 instruct the Committee of Revision, etc., to pay the experts and others employed in the preparation and publication of the Seventh Decennial Revision of the Pharmacopœia.

Strength of Tinctures, Acids, etc.—The Committee of Revision is authorized, if in its judgment considered best, to make the strength of all official tinctures, wines, and dilute acids, ten per cent. In the case of dilute acids the strength to be ten per cent of the official acid and not of absolute acid. Infusions and decoctions to be five per cent instead of ten per cent as at present.

Preceding the discussion which took place upon the subject of weights and measures, the Convention listened for twenty minutes to an address by Prof. Hilgard, of the U. S. Coast Survey, in the course of which he described the history of federal legislation with regard to the adoption of standards for weight and mass. Fac-similes of the standard meter and kilogramme recently prepared by direction of the International Congress for establishing these standards, were shown, and the characteristic features of the standards themselves were described. In the discussion which followed it became evident that there is general dissatisfaction with the "parts by weight" system adopted for the revision of 1880, and, with but little dissent, it seemed desirable that parts by weight should be adopted for solids, and parts by measure for liquids, excepting such as, on account of their viscid or adhesive character, or some other reason, are better weighed than measured. The final vote by which this change was authorized and the metric system adopted for both was almost unanimous, the Southern and Western delegates being among the most enthusiastic.

With the exception of the last resolution (by Mr. Ebert), recommending a change in the strength of tinctures, wines, etc., the directions to the new Committee of Revision and Publication remain in almost the identical form in which they were presented by the Committee of 1880. Nearly all of them were discussed at length, and numerous amendments were offered, but finally the original text was accepted.

The following was adopted as the basis for the next decennial Convention:

Resolved, The President of the Convention shall, on or about the first day of May, 1899, issue a notice, requesting the several bodies represented in the Conventions of 1880 and 1890, and also such other incorporated State medical and pharmaceutical societies and incorporated colleges of medicine and pharmacy as have been in continuous operation for at least five years immediately preceding, to elect a number of delegates, not exceeding

three, and the Surgeon-General of the Army, the Surgeon-General of the Navy, and the Surgeon-General of the Marine Hospital Service to appoint each not exceeding three medical officers, to attend a general Convention for the Revision of the Pharmacopœia of the United States, to be held in Washington, D. C., on the first Wednesday of May, 1900.

Resolved, The several bodies, as well as the medical department of the Army, Navy, and Marine Hospital Service thus addressed, shall also be requested by the President to submit the Pharmacopœia to a careful revision, and to transmit the result of their labors, through their delegates, to the Committee of Revision and Publication at least three months before the next meeting of the Convention.

Resolved, The several medical and pharmaceutical bodies shall be further requested to transmit to the President of this Convention the names and residences of their respective delegates as soon as they shall have been appointed; a list of whom shall be published, under his authority, for the information of the medical public, in the newspapers and medical journals in the month of March, 1900.

Resolved, In the event of the death, resignation, or inability of the President of the Convention to act, these duties shall devolve, successively, in the following order of precedence: upon the vice-presidents, the secretary, the assistant secretary, and the chairman of the Committee of Revision and Publication of the Pharmacopœia.

Resolved, That the Committee is authorized and directed to publish a supplement at the end of five years, if necessary.

Resolved, That the Committee shall report a complete plan for the revision of the Pharmacopœia at the next decennial Convention.

College of Pharmacy of the City of New York.—The sixtieth annual commencement of the college took place, before a very large and interested audience, at the Metropolitan Opera House on Tuesday evening, April 29th. The arrangements were perfect, and great credit is due to the Committee of Arrangements and to the class officers. The following is the list of graduates:

John P. Arnold, Gurdon S. Badger, Charles S. Bailey, Sumter L. Beegle, Carl Benkendorfer, Charles T. Bischof, Charles H. Braecklein, Samuel Brann, Hugo G. Braeunlich, Hugo H. Brown, Lewis W. Brown, Marius A. Carpenter, Conrad G. Carver, Raoul R. D. Cline, May V. Crosby, William E. Dennis, Arthur L. Dickinson, Arthur Du Bois, Frederic D. Doolittle, Alphonse Dubus, Harry B. Epstein, William G. Everett, Robert Flaws, Jr., William C. F. Goerdes, Abram J. Hardenbergh, Jr., Oscar G. Harrison, William C. Hassler, Frederick C. Heckel, Louis F. Hiltz, Horner H. Howgate, John J. Hubschmitt, Louis D. Huntoon, Eugene R. Hynard, Louis Ilse, William E. Jennings, August G. Jung, Gustave Katz, Joseph F. Keller, Rudolph G. Kellner, Louis J. Kocher, Hugo Kunz, James T. Lennon, Henry C. Lovis, James McCall, Joseph Moschowitz, Edward A. Mueller, Adolph Mund, Henry W. Nolte, William A. Orlich, Frederick Peiter, Earl F. Perry, Lavinius W. Peterson, Antonio Pisani, Hearn J. Power, Henry K. Preston, Leo Ratner, Arthur J. Reeder, Joseph E. Renton, Charles E. Rice, Jr., Frank W. Richtmyer, Charles R. Robinson, William J. M. Robinson, Walter S. Rockey, Charles H. Roese, Leo Rosenblum, John E. Ryan, James H. Scanlan, William Schroeder, Mowry Sheldon, James L. Shell, Norman H. Sipperly, Frank M. Small, Clarence I. Smith, Clarence P. Smith, Nelson P. Snow, Andrew G. Stafford, Edward Steeb, Abraham L. Stelle, Charles C. Stewart, Adolph Stierle, Jr., Louis Stuermer, Joseph Trostler, Louis H. Unbehaun, Dietrich W. Vogt, Harry W. Walp, Michael A. Walsh, Louis Warth, Le Roy Washburn, Grant J. Woolston, Isaac S. Zeman, Albert P. Zoller.

The alumni prizes were awarded to the following graduates:

First prize, gold medal, to John P. Arnold, who also received a special prize for excellence in pharmacy; second prize, silver medal, to Adolph Stierle, Jr.; third prize, bronze medal, to Wm. J. M. Robinson.

The valedictory was delivered in a very able and impressive manner by Louis F. Hiltz, and the address to the graduates by the Rev. Dr. John Hall, D.D., LL.D., Chancellor of the University of the City of New York.

Estimation of Fat in Sour Milk.—According to M. Kühn, the sour milk is just rendered alkaline with aqueous potash (40 Gm. in one liter of water), thereby dissolving the casein. Ten Gm. of the alkaline milk are poured on to a mixture of 25 Gm. of ignited gypsum, 4 Gm. of precipitated calcium carbonate, and 2 Gm. of potassium hydrogen sulphate, dried, ground up, and extracted in a Soxhlet's extractor. The addition of potassium hydrogen sulphate prevents the slight excess of alkali from saponifying the butter fat, while the calcium carbonate neutralizes the remainder of the potassium hydrogen sulphate.—*Milch-Zeit.* and *J. Chem. Soc.*

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,435.—Castile Soap (Subscriber).

There is always some variation in the composition of so-called castile soap, though made by one and the same manufacturer. The best grades are made with the best commercial grades of caustic soda, and therefore contain but a small quantity of matter insoluble in alcohol. A recent analysis of some castile soap, published in the *Chem. and Drugg.*, gave the following composition:

Fatty Acids.....	64.80
Soda, in combination.....	8.60
Soda, uncombined.....	0.01
Sodium Carbonate.....	0.00
Sodium Chloride.....	0.40
Sodium Sulphate.....	0.14
Silica.....	0.00
Matter insoluble in water.....	0.70
Unsaponified Oil.....	0.00
Water.....	26.50
	101.15

The excess over 100 is due to the fact that the acids were not calculated as anhydrous.

No. 2,436.—Shaving Soap (M. E. S.).

A good shaving soap may be prepared as follows:

Melt 700 parts of pure lard in a porcelain vessel placed in a salt-water bath, or heated by steam, and very gradually add to it, under constant stirring, a solution of 97 parts of caustic potassa in 278 parts of water. When about half of the potassa solution has been added, the mixture begins to thicken, and gradually becomes so thick that it can no longer be stirred after all the alkaline solution has been added. The mass is now finished, but it is customary to impart to it a sort of mother-of-pearl gloss, which is done by triturating the soap in a mortar with a solution of $1\frac{1}{4}$ parts of oil of bitter almond (or other essential oil) in 20 parts of alcohol, gradually added, and beating and mixing the mass thoroughly.

Another formula is the following, recommended by Dieterich:

Melt $12\frac{1}{2}$ av. oz. of beef suet with 6 av. oz. of cocoanut oil at a temperature of 122° F., and add $10\frac{1}{4}$ av. oz. of a solution of soda containing 25 per cent caustic alkali, and $1\frac{1}{4}$ av. oz. of a like solution of potassa. Continue the heat at the above temperature for half an hour, stirring the mass constantly, or until it appears as a thin paste, then add to it a suitable perfume.

No. 2,437.—Guenzburg's Reagent and Lind's Reaction. (M. E. C.)

Our correspondent asks us what Lind's reaction is. Since the application of this has, of late years, become more universal through the fact that Guenzburg reversed it for the detection of hydrochloric acid, we have put the words "Guenzburg's Reagent" at the head of the query. This we have spoken of in previous issues; for instance, in our volume for 1888, pages 118, 146.

Lind's reaction has for object the detection of phloroglucin or of vanillin. If a piece of pine wood moistened with hydrochloric acid is brought in contact with a solution of phloroglucin, it assumes a red color. This is caused by vanillin, derived from the coniferin in the pine wood. The reaction may be made with vanillin direct by adding some phloroglucin to a small quantity of a freshly prepared solution of vanillin (vanillin 1 part, alcohol 100, water 100, strong hydrochloric acid 600 parts). The vanillin solution will turn red. This reaction is not given by the compounds even most closely related to phloroglucin. However, with orcin there is a light-blue solution produced, with a red-dish hue. The reaction permits the recognition of as little as 0.001 Mgm. or $\frac{1}{14150}$ grain of phloroglucin.

Guenzburg found that by inverting the reaction it could be used for the detection of hydrochloric acid. For this purpose a solution of 2 Gm. of phloroglucin and 1 Gm. of vanillin in 30 Gm. of alcohol is employed. If a few drops of a liquid containing hydrochloric acid are mixed with a few drops of the reagent, and the whole gently heated over a flame, a crimson-red color will develop at the outer edge of the liquid, and this will gradually spread as the liquid dries up. The reaction is capable of revealing hydrochloric acid, even when highly diluted (1 in 20,000). Lactic acid does not produce the reaction, hence it may be used to demonstrate the presence or absence of hydrochloric acid in the gastric juice, and for this purpose it was first recommended by Dr. Germain Sée.

No. 2,438.—"Cough Mixture" (P.).

This subscriber wants us to send him a formula for a "cough mixture." While we do not, as a rule, approve

of general formulæ for compound medicines to be used promiscuously for self-medication, yet we recognize that there is a popular demand for certain medicines required to treat simple cases. We may therefore state that, for general purposes, the official Brown Mixture (Mistura Glycyrrhizæ Co.), or Stokes' Expectorant Mixture, will probably be the most suitable. The formula of the latter will be found in the National Formulary under No. 89.

No. 2,439.—Dobell's Solution (F. R. E.).

This has the following composition:

Borate of Sodium (Borax).....	120 grains.
Bicarbonate of Sodium.....	120 "
Carbolic Acid, crystallized.....	24 "
Glycerin.....	$\frac{1}{4}$ fl.oz.
Water.....	enough to make 16 "

Dissolve the salt in 8 fl.oz. of water, then add the glycerin, and the carbolic acid previously liquefied by warming, and lastly enough water to make 16 fl.oz.

It will be found in the National Formulary under No. 235 (Liquor Sodii Boratis Compositus).

No. 2,440.—Sugar-coating Pills ("Reader").

It is seldom that extemporaneously sugar-coated pills have a handsome appearance. This is usually accomplished only by employing special apparatus and working on a large scale. Consult Remington's "Practice of Pharmacy," page 1113, and AMERICAN DRUGGIST for 1889, page 153.

The sugar to be used must be in the finest possible powder (such as is sold as confectioner's sugar), and the pills must be perfectly dry exteriorly. Place the pills into a copper bowl—broad, shallow, round, and closed on top, with a handle—having first moistened the inside of the bowl with syrup, or with a mixture of syrup and mucilage. Roll the pills about by rotating the closed bowl over a flame. When they are uniformly coated, dust powdered sugar on them from time to time, and keep rotating and warming until the coating is dry, uniform, and smooth.

Another method, recommended by Hager, is as follows: Dissolve 1 part of white gelatin in 4 parts of distilled water by means of a water-bath. Make a mixture of 20 parts of sugar, 10 of starch, and 5 of tragacanth, and reduce it to the finest possible powder. Put about 2 heaped teaspoonfuls of this powder in a box, such as is used for silver coating; add about 25 drops of the warm gelatin solution, and then 50 of the pills to be coated. The pills must have been previously thoroughly dried, and, just before being put in the box, moistened with the gelatin solution. Now shake the box containing the pills, with a rotary motion, for about three minutes, and empty the contents upon a sieve. Separate the powder, replace the pills in the box, and keep rotating and shaking until the coating is smooth and glossy. If the coating is too thin, the pills must be taken out and dried before a new coating is put on.

Still another way consists in moistening the pills with a mixture of 1 part of glycerin and 2 parts of alcohol, and shaking them in a box with enough of a finely powdered mixture of 20 parts of sugar, 3 of arrowroot, and 1 of mastic. Sometimes this method is modified by dissolving 1 or 2 parts of mastic in the alcohol and glycerin.

No. 2,441.—Syrupus "contre la Toux" (C.).

This syrup or mixture is prescribed by a prominent physician of New York for children suffering from bronchitis. We are informed that it has the following composition:

B Syr. Ipecacuanhæ.....	2 fl. dr.
Spir. Æther. Nitr.....	2 fl. dr.
Olei Ricini.....	3 fl. dr.
Syr. Tolutani.....	1 fl. oz.

M. "Shake the bottle before dispensing."

Dose—a small teaspoonful, according to the cough, every two to four hours.

No. 2,442.—Prescription Query (J. E. S.).

This subscriber states that he finds a reaction to occur when Aqua menthæ piperitæ and Spiritus ætheris nitrosus are mixed together. A gas is given off, according to his observation.

The cause of the evolution of the gas, in our opinion, is this, that our correspondent makes his peppermint water in the old way, viz., by rubbing the oil first with carbonate of magnesium, thus dissolving a small amount of this salt along with the oil in the water subsequently added. His spirit of nitrous ether is most likely—as usual—acid; hence, when the two liquids are poured together, the free acid of the spirit of nitre attacks the dissolved carbonate of magnesium, and carbonic acid gas is given off.

No. 2,443.—Prices of Metals.

Our correspondent will find a comparative list of prices of metals in our volume for 1886, page 35. The list there given enumerates only those which are usually obtainable in the market in quantities, varying, of course, according to the uses to which they are applied.

The prices of others are not fairly comparable with those used in the arts. Many of them are made only on a small

scale, for scientific purposes or for museum specimens, and are only prepared when there is a fresh demand for them. Some are very readily obtainable, and hence their value is small; others again are very rare, and troublesome to extract. Thus metallic selenium costs about \$2.80 per ounce, while metallic gallium costs some \$250 per gramme, equivalent to about \$7,150 per ounce. Of course, the latter cannot be bought in such quantity in the market. The price lists of dealers in chemicals usually quote the rare metals.

No. 2,444.—Separation of Animal or Vegetable from Mineral Oils (J. E.).

This correspondent writes: "Can you give me a simple method of determining the *quantity* of animal or vegetable oil in a mixture of these with petroleum oils, as used in the manufacture of lubricating oils?"

The method of separating petroleum oils (so-called mineral oils) from animal or vegetable oils consists in subjecting the mixture to a process of saponification. Animal or vegetable oils, consisting of fatty acids in combination with glyceryl (the radical of glycerin), are perfectly saponifiable by alkalies (potassa or soda), and the resulting soap is soluble in water. Mineral oils are not saponifiable and are left unaltered. Yet when such a mixture is saponified, the mineral oil does not completely separate from the mixture, a portion of it being obstinately retained by the soap solution. That portion which is thus retained may be recovered by agitating the soap solution with ether. The latter will rise to the top—if the agitation was too violent, it will require a long time for separation—and may be poured off. This is repeated as long as ether extracts anything. The ethereal solution is then evaporated and the residue weighed. This is the mineral oil.

Another simple method is the following:

Into a beaker glass of suitable capacity put a weighed quantity of the suspected mixture of oils. Supposing it were 10 Gm.; now add to it 50 C.c. of an alcoholic solution of soda containing 80 Gm. of soda in 1 liter, and warm on a water-bath, continually stirring, for about twenty minutes, if necessary replacing some of the alcohol as it evaporates. If no sign of saponification has made its appearance, the oil is simply of mineral origin and contains no animal or vegetable oil. If saponification has taken place, add to the contents of the beaker some clean, dry and fine sand (about 100 Gm.), and evaporate off the alcohol, stirring constantly so as to obtain a thorough and intimate mixture of the partly or fully saponified residue with the sand. Dry this thoroughly. Now treat it with benzin (or ether), warming on a water-bath so that the solvent may be kept for a short time at a boil, and pour off the solution. Repeat this until a drop of the solution no

longer leaves a permanent stain on blotting paper. Finally evaporate the benzin solution, and weigh the residue, which is the mineral oil.

The mixture of sand and saponified mass may also be removed from the beaker and extracted with benzin or ether in a Soxhlet or other kind of extractor. Of course this is much more economical, so far as menstruum is concerned.

2,445.—American Soda by Solvay's Process (Newark).

The Solvay process of manufacturing soda is carried on in the works at Geddes, near Syracuse, State of New York. It is said that these works will soon be able to supply almost the entire demand for alkali in this country.

The principle of the Solvay process is this: that when a current of carbonic acid gas is passed through a solution of common salt previously saturated with ammonia, the chloride of sodium is decomposed, chloride of ammonium being formed together with bicarbonate of sodium.

The salt solution is obtained from the rich salt beds which are situated not far from the works. Water is simply allowed to flow into the mine, and the brine is then pumped up.

Into this brine ammonia and carbonic acid are conducted. The solution soon becomes turbid from the separation of sodium bicarbonate. After a certain time, when it is known that this salt is no longer formed, the gas is shut off, the turbid solution run into filters, which retain the bicarbonate, and the clear liquid run off to tanks, where the ammonia is recovered by treating the mixture with milk of lime. The latter is obtained from caustic lime prepared on the spot by heating limestone in kilns. The carbonic acid given off thereby is used for saturating the brine. When the solution of chloride of ammonium is treated with the caustic lime, in form of milk, and heat is applied, the ammonia is given off and used over again for saturating brine. The ammonia therefore is, at least theoretically, not consumed, but used continuously. In practice, of course, there is a small loss. The final solution left after all ammonia has been distilled off contains calcium chloride, which is the only waste product.

The bicarbonate of sodium caught by the filters is dried and heated to expel one-half of the carbonic acid, which is likewise utilized again for saturating the first brine. The residual dry sodium carbonate is then dissolved in water and crystallized.

If caustic soda is wanted, it is heated with milk of lime, whereby calcium carbonate is precipitated and caustic soda remains in solution. The carbonic acid contained in the precipitated calcium carbonate is likewise recovered and utilized over again.

BIBLIOGRAPHY.

1. **LES PLANTES MÉDICINALES INDIGÈNES ET EXOTIQUES.** Par DUJARDIN-BEAUMETZ et EGASSE (pp. 900, with 1,084 illustrations). Giving the natural history, chemistry, botany, medicinal uses, etc., of the principal medicinal plants of all countries.

2. **TRAITÉ DES ALCALOÏDES.** Par B. DUPUY. In two very large volumes, containing a compilation of the essential data concerning the alkaloids so far known, particularly those which have been studied physiologically or clinically.

THESE volumes contain much information gathered from otherwise little accessible sources (chiefly from French ephemeral literature). At the same time the author has overlooked much information which might have been gleaned from foreign sources. Nevertheless, these works are of great usefulness.

LESSONS IN QUALITATIVE AND VOLUMETRIC CHEMICAL ANALYSIS. For the use of Physicians, Pharmacists, and Students. By CHARLES O. CURTMAN, M.D., etc. Including Dr. F. Beilstein's Lessons in Qualitative Chemical Analysis, Arranged on the Basis of the Last German Edition. Third Edition. Illustrated. St. Louis, Mo.: John L. Boland Book and Stationery Co., 1889. Pp. 200, 8vo (small).

WE have already commended the features of former editions, from which it does not differ greatly.

A MANUAL OF CHEMISTRY FOR THE USE OF MEDICAL STUDENTS, By BRAN-

DRETH SYMONDS, A.M., M.D. Philadelphia: P. Blakiston, Son & Co., 1889.

THIS consists of an aggregation of the facts which it is considered desirable for the medical student of the present day to know. Their usefulness is not limited to the period of his college course, but relate to his daily life as a practitioner.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Thirty-seventh Annual Meeting, held at San Francisco, June, 1889, etc. Philadelphia, 1889. Pp. 850, 8vo.

THIS report increases in value as a work of reference, and becomes each year more indispensable for every pharmacist. The dealer in cigars and soda water who has a pharmaceutical annex will likewise find much in it that will be profitable reading.

THE CALENDAR OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN. 1890. Pp. 535, 8vo.

OF local interest only, but might serve as a model for similar publications in this country.

SPINAL CONCUSSION. By S. V. CLEVENGER, M.D., etc. With 30 Wood Engravings. Philadelphia: F. A. Davis, 1889. Pp. 359, 8vo. \$2.50.

A FORM of nerve-disturbance, sometimes called "Erichsen's Disease," has long been recognized as a result of injuries resulting from falls and railroad collisions. Already the medico-legal questions involved have led to numerous writings on the subject, and a summary of the opinions and observations already expressed is needed.

The author adds the results of his own experience.

A LABORATORY GUIDE IN URINALYSIS AND TOXICOLOGY. By R. A. WITTHAUS, A.M., M.D. Second Edition. New York: William Wood & Co., 1889. Pp. 75, 8vo.

THIS is purely a work for the pocket of a student in practical laboratory exercises, supplying the information requisite, and furnishing blank paper for notes and remarks.

A MANUAL OF ORGANIC MATERIA MEDICA. Being a Guide to Materia Medica of the Vegetable and Animal Kingdoms, for the Use of Students, Druggists, Pharmacists, and Physicians. By JOHN M. MAISCH, Ph.M., Ph.D. Fourth Edition, with 259 Illustrations. Philadelphia: Lea Brothers & Co., 1890. Pp. 539, 8vo.

In all respects the best hand-book of the kind published in this country.

PRACTICAL ELECTRICITY IN MEDICINE AND SURGERY. By G. A. LIEBIG, JR., Ph.D., and GEORGE H. ROHÉ, M.D. Profusely Illustrated. Philadelphia: F. A. Davis, 1890. Pp. 383, 8vo. \$2.00.

THIS work seems to have been prepared with great care as regards details, and it is not open to the objection which obtains in many instances with works professing to be "practical," viz., that the only practical thing which seems to enter into their composition is the advertisement of the author. In the present state of electrical science there are many novelties for the student of twenty years ago, and the aid of a work like this will be essential to their comprehension.

ardization, but it seems to me that the time for standardization has not come yet. Standardization, if carried out to-day, can only be arbitrary; it will always be so, but if the plan below outlined were followed it would rest on a better basis. Would it not be wiser to undertake plant analysis systematically, and not to wait until some one feels like analyzing a certain favorite plant of his? We are well aware that plant analysis is rather difficult and consumes considerable time, but still it would be a comparatively easy task to have sufficient analyses performed between now and 1900, so that we may try standardization with a positive knowledge ten years hence. What benefit could we not derive from systematic and frequently repeated analyses of the several hundred crude drugs of the United States Pharmacopœia?

This work could be performed by a committee of analysts, who should be paid for their time and labor. A small tax upon each pharmacist—if it could be collected—would yield sufficient income for this purpose. It might be well to bear this proposition in mind for the Decennial Pharmacopœial Convention of 1900.

With our present knowledge a case may occur where a drug containing a resin supposed to be the active principle is exhausted with alcohol, while the real active principle, which happens to be less soluble in alcohol, is not represented in the liquid product at all. There certainly have been, and are still, some fluid extracts which do not possess the peculiar action of the drug. But more frequently we find remarks like the following in the several dispensatories: "Without doubt represents whatever virtues the crude drug may contain" (see Extr. Cornus fl., U. S. Disp.); "Probably contains all the medicinal qualities of the drug" (see Extr. Pareira fl., Nat. Disp.); "Doubtless this preparation represents the undetermined virtues of viburnum" (see Extr. Viburni fl., Nat. Disp.); "It is probable that this preparation contains all the active constituents of xanthoxylum" (see Extr. Xanthoxyli fl., Nat. Disp.). We generally look to the dispensatories for positive and not conjectural knowledge; but can the authors convey knowledge which they themselves do not possess?

This leads me to say a few words regarding tests generally recommended to be observed in the exhaustion of drugs, such as absence of taste or color in the last percolates. These are not always accurate tests. It is said that the first 85 per cent of percolate contains nearly the whole of the active principles of the drug; but this is not enough. What should be done is this: In starting we should first know how much of active substance the drug contains; when the full amount of the required or desired percolate has passed, we should continue the percolation with a little more menstruum, then examine this with our tests for more active constituents. The latter could easily be done, except in cases where our knowledge of active constituents is still deficient; or, until we possess a more complete knowledge, we could experiment with the same quantity of the crude powdered drug and the corresponding fluid extract or tincture, etc. In selecting, then, the best possible menstruum, we must know what we are aiming at. We must not only select one which is the solvent of the active ingredients, but one which acts as a complete solvent. The necessity of this will be shown in its proper place. At the same time the selected menstruum should dissolve as little as possible of the inert substances.

In cases where we are well acquainted with the constituents of a drug, the selection of a menstruum should be based upon the solubility of the active constituent or constituents in the menstruum.

The records regarding solubility are not as complete or uniform as we would desire; only the solubility in water and alcohol at different temperatures is generally given. Very seldom do we find a remark about the solubility in varying mixtures of alcohol and water; but this is just what we need most. I have therefore bought several alkaloids to determine their solubility in different menstrua—viz., strychnine, caffeine, atropine, cinchonidine, cinchonine, cocaine—but have only made trials as follows:

Cocaine (P. D. & Co.'s), 1 grain did not dissolve in 4 oz. of water (while it is said that 1 part dissolves in 7 of water), when I gave up the attempt, nor in 2 oz. diluted alcohol. Atropine, 2½ grains easily dissolved in 1 oz. diluted alcohol. Caffeine, 10.6 grains did not wholly dissolve in 1 oz. alcohol (1:75), the same quantity dissolved slowly in the pharmacopœial menstruum and almost rapidly in the menstruum proposed by A. Robbins—1 alcohol, 2 water. At this result I am rather astonished. In the menstrua of alkaloidal preparations we find in some instances alcohol, as in fl. extr. and tinct. of gelsemium, fl. extr. of belladonna (root), tinct. of physostigma. In others we find different percentages of alcohol or diluted alcohol, and in a number of cases it is proposed to lower the percentage of alcohol. This may be a desirable feature, if such a weaker menstruum accomplishes the same result as a stronger one, and does not load the finished product with undesirable substances.

Very often we find a remark like this in the "Digest," "Probably 1 water + 2 alcohol would do just as well," without any appearance that any trial has been made with such different menstruum.

It might be suggested that any person who hereafter criticises any preparation of the Pharmacopœia, and is under the impression that his formula would furnish a better product, send in a sample of it to the chairman, so that it can be examined, and also time be given to observe any possible change.

[Mr. Weber has, indeed, forwarded, together with his paper, an interesting set of samples to illustrate various points which he makes.—Ed. AM. DRUGG.]

From the statements of the U. S. and Nat. Dispensatories given above, it appears that no analyses are made to ascertain if the residue still contains any active constituents. To judge from the numerous criticisms on the different percolates, it would appear illogical to say in the official directions "until exhausted," because not infrequently this does not seem to be the case. Why not make a number of experiments to determine this point?

In making different trials I have not made fluid extracts, but simply tinctures, and these only by maceration; the latter partly for convenience' sake and partly to determine a few other points to be considered later.

But in making these preparations I was struck with the nauseating taste and odor of such as belladonna and coca leaves when made with diluted alcohol; other similar drugs probably behave in a like manner, as hyoscyamus, stramonium, digitalis, and this would seem to me one more reason why they should only be made with alcohol. Alcohol has three drawbacks—high price, danger of evaporation and thus rendering a preparation stronger (but no experiments seem to exist to show how much an alcoholic fluid extract or tincture, well stoppered, will lose, say, in one year), and fear of alcoholic effects, which, however, is very slight in the case of fluid extracts. With some persons it may be more the high price of alcohol than anything else which makes them prefer a weaker menstruum. Also, the contrast in color is very striking; those made with alcohol are of a rich green and those made with diluted alcohol of a more olive-green color. This difference in color should be a good criterion, when we purchase a fluid extract, for instance, to judge at a glance of the menstruum employed, unless it be artificially colored; because I am under the impression that even houses which claim to use a menstruum specially adapted for each drug do not do so, but not infrequently make something like an infusion and preserve it with a small quantity of alcohol. Of course, in claiming in their price lists to use only the best possible menstruum for each drug, they assume more knowledge than other mortals possess, and if they really possess this knowledge they should give it to the world, so that others could enjoy it also.

At this juncture we may also put on record a statement we find in the manuals on pharmacy, either in this form: "The value of diluted alcohol consists in its possessing the solvent powers of both water and alcohol," or as follows: "It has been supposed that the affinity for each other of the two ingredients in this liquid interferes somewhat with the solvent powers of each, etc.; but the reverse of this is the fact, and a mixture of alcohol and water is stated to be a better solvent of the resinous and extractive principles of plants than the same quantity of these two liquids separately employed." These are rather perplexing statements. If this was really the case, we need not use any alcohol of 94% at all, but could use with advantage, in all cases where alcohol would seem to be indicated, simply diluted alcohol, expecting the same result as if we had employed alcohol. Regarding this point I have made a few experiments, and shall give the results under the proper headings.

In selecting a menstruum for alkaloidal or glucosidal, etc., substances, we cannot, perhaps, overlook the fact that the alkaloids and other active constituents do not reside in the plant in the state in which we obtain them by chemical means, but generally combined with some acid or other substance: for instance, aconitine combined with aconitic acid—the alkaloids of belladonna probably combined with malic acid, both of which acids are easily soluble in water and alcohol—or cinchona, whose alkaloids are probably combined with one or more of the following acids: kinic, kinovic, and cincho-tannic acids, the first one being readily soluble in water, less so in strong alcohol; the second one insoluble in water, and only slightly in cold alcohol, etc.—or emetine combined with ipecacuanhic acid, etc. These natural combinations might render an alkaloid or other substance more soluble in a weaker alcoholic menstruum than we would expect from the solubility of the pure alkaloid in the same menstruum. We should expect that a malate of atropine or an aconitate of aconitine, etc., would be the best forms in which to employ these isolated principles, but nobody seems to manufacture them.

Besides this class of preparations there remain not a few with a volatile oil as the principal ingredient; in such cases alcohol seems indicated, unless it can be shown that certain volatile oils dissolve just as freely and easily in a weaker alcoholic menstruum. The Pharmacopœia uses different menstrua for the extraction of the latter, as low as diluted alcohol, but it can easily be shown that diluted alcohol is not the proper menstruum for them. They are then only partially extracted, and this incomplete exhaustion is practically a waste of material.

I have often been struck with the feeble taste and flavor of an aromatic tincture made with diluted alcohol, and I have also made a few comparative experiments with alcohol and diluted alcohol.

The calculations given in the following are based on the solubility of the pure alkaloids in different menstrua, and are perhaps not entirely correct in view of their occurrence in combination.

The plant analyses cited in what follows are generally taken from Maisch's "Organic Materia Medica," fourth edition, Nat. Disp., and Möller's "Lehrbuch d. Pharmakognosie," 1889. It would be impossible for me to give all the different views we find in similar works; to gain any result we have to follow certain standards.

Extractum Aconiti Fluidum and *Tinctura Aconiti*.—Object sought, aconitine; there are controversies regarding other alkaloids.

Amount of aconitine as high as 0.4 per cent (Möller), alkaloids about 0.07 per cent (Maisch). Menstruum, alcohol; proposed to reduce alcoholic strength to 70 per cent (Tscheppé) or diluted alcohol (Squibb). To calculate from the above figure, 0.4 per cent, 1 pound of aconite root can contain 2.0 Gm. or 30 grains of aconitine, 100 parts of cold water dissolve less than 1.0 Gm. or 15 grains (Proctor). Thus we find that aconitine could be obtained in the form of fluid extract with diluted alcohol, if no other objections exist.

Extractum Arnice Radicis Fluidum and *Tinctura Arnice Radicis*.—Constituents, volatile oil, acrid and tasteless resins, arnicin sparingly soluble in water (Maisch). Active principle, most likely the volatile oil, the acrid and tasteless resins. (What is meant by the latter it is difficult to understand.) Menstruum, diluted alcohol; perhaps alcohol indicated.

Extractum Aromaticum Fluidum.—Composed of aromatics with volatile oils; the menstruum, alcohol, is therefore most proper.

Extractum Aurantii Amari Fluidum (menstruum, 2 alcohol, 1 water) and *Tinctura Aurantii Amari* (diluted alcohol).—Constituents, volatile oil and hesperidin, the latter sparingly soluble in water; therefore, to obtain a really good percolate, alcohol would seem to be indicated.

Extractum Belladonnæ (Radicis) Fluidum.—Active principle, atropine from 0.3 to 0.6 per cent (Möller), besides belladonnine and hyoscyamine. Menstruum, alcohol. Weaker menstrua recommended in the "Digest." Calculation, 1 pound of belladonna root can contain 3.0 Gm. (or 45 grains) of atropine; this quantity would readily dissolve in a pint of diluted alcohol, as ascertained by a trial on the small scale, if no other objections exist.

Extractum Brayeræ Fluidum.—Object sought, kosin; menstruum, alcohol, which is correct, as kosin is insoluble in water.

Extractum Buchu Fluidum.—Menstruum, 2 alcohol, 1 water. "Digest" says alcohol is a better menstruum; but our dispensatories say this is the official menstruum. First the National Dispensatory: "Experience has shown that the fluid extract is much superior to that made with alcohol; the odor and taste of buchu leaves are well marked"; and above this, "The volatile oil and other medicinal principles are dissolved and kept in perfect solution by the menstruum directed." The United States Dispensatory says: "This fluid extract has been greatly improved by lessening the alcoholic strength of the menstruum. After having ordered a stronger alcoholic menstruum for twenty years, the Pharmacopœia now adopts the menstruum originally suggested by Prof. I. J. Grahame as long ago as 1859. It has been abundantly proved by experience that the weaker menstruum effectually exhausts buchu of its virtues, etc." This point seemed to me easy to solve. I therefore made two tinctures of buchu, one with the pharmacopœial menstruum, and one with alcohol: I took 1 av. oz. of the whole leaves to 10 oz. menstruum, filtered after seven days, and obtained of both about 8 oz. of finished tincture, both of which were brought exactly to 8 oz. Of each one I took one-half drachm, diluted to 2 fluidrachms, and the taste of the tincture made with alcohol has a warm, camphoraceous taste, while the other tincture has a decidedly weaker but more pronounced bitter taste. This bitter taste is also present in the alcoholic tincture, but is covered by the camphoraceous principle. In short, the alcoholic tincture produced just the effects as we find the physiological action ascribed to it. Chewing of the extracted leaves found those treated with alcohol almost tasteless; those treated with the United States Pharmacopœial menstruum still possessed of a strongly marked camphoraceous taste, a result which we justly had to expect. If we ask now what is the active constituent or constituents of buchu, the answer is: "Volatile oil, resin, mucilage, bitter principle, rutin (?), etc." (Maisch). "A volatile oil which is probably the active principle, and gives them a peculiar and penetrating odor, resembling that of peppermint; also barosmin, a bitter extractive, and resin, etc." (Potter). "Buchu contains a volatile oil in the proportion of about 1.5 per cent. This volatile oil consists of a crude oil and a camphor-barosma camphor. The latter has a nearly pure peppermint odor. The existence of barosmin, so-called, is doubtful" (Bar-

tholow). These different statements go to prove that the tincture (and a fluid extract must behave in the same manner) made with alcohol is and must prove far superior to one made with a weaker alcoholic menstruum.

Extractum Calami Fluidum.—Active constituents, volatile oil 2.8 per cent (Möller); volatile oil 1 to 2 per cent, acorin 0.2, insoluble in water (Maisch). Menstruum, alcohol, which would seem the most appropriate.

Extractum Calumbæ Fluidum (menstruum, diluted alcohol) and *Tinctura Calumbæ* (3 alcohol, 2 water).—Principal constituents, berberine and calumbin, both of which are sparingly soluble in water; therefore alcohol would appear indicated as menstruum. I therefore concluded that a tincture made with alcohol would have a more bitter taste; accordingly I made two tinctures, one with alcohol and one with diluted alcohol, but they seem to differ but little in taste. But one advantage I can see, and that is that the tincture made with alcohol presents a more handsome appearance. Several new menstrua are recommended in the "Digest."

Extractum Chimaphilæ Fluidum.—Menstruum, diluted alcohol. "A stronger alcoholic menstruum is to be preferred" ("Digest"); this will be understood when we recollect that its action probably depends on arbutin, sparingly soluble in cold water; besides, chimaphila contains chimaphilin, which is indifferent, and also ericolin and urson, both of which are insoluble in water. Whether the latter two substances possess any physiological action is not known.

Extractum Chiratæ Fluidum; Tinctura Chiratæ.—Menstruum for both, diluted alcohol. Agent sought, chiratin, easily soluble in water and alcohol; besides ophehic acid, of which nothing is known. A weaker alcoholic menstruum could possibly be employed, as is also indicated in the "Digest."

Extractum Cimicifugæ Fluidum; Tinctura Cimicifugæ.—Constituents, nothing definite known, but action probably dependent on resins; menstruum, alcohol, but 3 alcohol and 1 water recommended in "Digest." The United States Dispensatory says: "There probably cannot be two opinions about the menstruum, although it has been asserted that a good fluid extract can be made with a menstruum of 3 parts alcohol and 1 water. The probabilities are, however, that a portion of the resinous principle would precipitate on standing."

Extractum Cinchonæ Fluidum; Tinctura Cinchonæ.—Menstruum, 25 glycerin and 75 alcohol; finish with 2 alcohol + 1 water; 10 glycerin, 65 alcohol, 25 water. In "Digest" I, under *Tinctura cinchonæ*, we read: "Hogg, Braithwaite, and others find that the menstruum does not extract quite one-half of the alkaloids." It would be a waste of space to give here a complete analysis of the different cinchona barks; what we are aiming at are quinine, cinchonidine, quinidine, cinchonine, and it will be interesting to append here Maisch's table of their solubility in water and alcohol.

	Soluble in parts of	
	Water.	Alcohol.
Quinine	1,670	6
Quinidine.....	2,000	26
Cinchonine.....	8,740	138
Cinchonidine.....	1,680	20

From this table alone alcohol would appear as the most rational menstruum. I have made two tinctures, one with alcohol and one with the pharmacopœial menstruum, presuming that the alcoholic tincture would present a more bitter taste. But the judgment by taste is deceptive. The most rational way would be an analysis.

Extractum Colchici Radicis Fluidum (2 alcohol, 1 water); *Extractum Colchici Seminis Fluidum* (same); *Tinctura Colchici* (diluted alcohol).—Principle, colchicine, 0.2-0.4 per cent (Möller), but probably also other substances. If colchicine only be sought, a weaker menstruum is applicable, as recommended in "Digest."

Extractum Conii Fluidum (3 hydrochloric acid + diluted alcohol); *Tinctura Conii* (4 acid and diluted alcohol).—Principle, coniine, one-fifth to one-half per cent (Maisch); but also methylconiine and conydrine. One part of coniine is soluble in about 100 parts of water.

[Some of the fluid extracts, etc., treated by the author, are omitted in this series, as no important change could be suggested.]

Extractum Cornus Fluidum.—Diluted alcohol. Cornin, probably the principal ingredient of cornus, soluble in water and alcohol.

Extractum Cubeæ Fluidum; Tinctura Cubeæ.—The composition of cubebs is too well established to be noticed here; but certainly the menstruum for the tincture should be the same as that for the fluid extract, viz., alcohol, or the berries will be incompletely exhausted.

Extractum Cypripedii Fluidum.—Menstruum, alcohol. "Digest" says 2 alcohol and 1 water is better; action similar to valerian, and probably also dependent on a volatile oil, in which case a change to a weaker menstruum would not be indicated.

Extractum Dulcamare Fluidum.—Menstruum, diluted alcohol. The "Digest" recommends 1 water, 2 alcohol; but if the medicinal virtues of dulcamara are due to solanine, the menstruum should be expected to be alcohol, as solanine is insoluble in water, and also the dulcamarin only sparingly in the same agents.

Extractum Erythroxyl Fluidum.—Menstruum, diluted alcohol; but perhaps alcohol indicated. So also "Digest." Composition, cocaine, not over 0.75 per cent (this percentage is very high), hygrine, traces of volatile oil, a peculiar tannic acid (Möller). To find out any possible difference in the physiological action if made with either alcohol or diluted alcohol, I macerated a portion of leaves in those two menstrua, brought the two, when finished, to the same measure; then figuring on the possible quantity of cocaine in 1 oz., I took twice of each portion 2 fluidrachms, with this result: The tincture made with diluted alcohol caused each time a slight frontal headache, which was not caused by the one made with alcohol; the exhilarating effect of the latter was also greater. This may partly be due to the volatile oil. As such trials are not always conclusive, I gave to my neighbor, a healthy, strong young man, also two doses of 2 oz. each, without, of course, telling him what the result would be, and he experienced exactly the same as I did.

Extractum Eucalypti Fluidum.—Menstruum, alcohol; "Digest," 3 alcohol + 1 water. Probably the only active ingredient is the volatile oil, 3 per cent (Möller), 6 per cent (Maisch); besides, the leaves contain resin. I also concluded to try these two menstrua; consequently I ordered some whole and powdered leaves, commenced several tinctures, but on testing the several tinctures after several days I found that those made with powdered leaves did not have the peculiar taste of the oil and turned less milky on the addition of water than those made of the whole leaves. Probably then the powdered leaves had lost volatile oil. As the time was limited, I filtered off—after only four days' maceration—the tincture made from the whole leaf with alcohol. I found the residue almost tasteless. Next I prepared a tincture of the whole leaves with 3 alcohol + 1 water; filtered also after four days and found the residue to still have a strong taste (see under Buchu). In this case the alcoholic tincture turns milky on the addition of water and possesses a warm, mint-like, and cooling taste, while the one made with the proposed weaker menstruum only shows a fluorescence when treated with water. This would, however, not be a disadvantage, but the oil is not fully extracted. This experiment would prove to me conclusively the advantage of a purely alcoholic menstruum, and if this should deposit largely then the fluid extract should not be made in large quantities. Perhaps this deposit has but little or no medicinal value.

Extractum Eupatorii Fluidum.—Menstruum, diluted alcohol; active constituents, eupatorin and volatile oil. As this substance is frequently used as a diaphoretic, perhaps alcohol as a menstruum would be more proper.

Extract of Cannabis Indica.

DR. CRIPPS LAWRENCE warns prescribers to be careful regarding the use of this extract, which is well known to be of exceedingly variable activity, owing to the crude drug being sometimes inert and sometimes active. He mentions that five years ago Messrs. Squire & Sons informed him that from the time Dr. O'Shaughnessy first introduced cannabis indica into England, and gave some to the late Mr. Peter Squire in order to make it into an extract, up to the present day, they have been continuously supplied by the original collectors of the plant, and each sample has proved good, yielding efficient preparations; but they have found that the active principles vary in different specimens of the plant from year to year, so that they cannot predicate the actual degree of potency to be attributed to an extract or tincture prepared under identical conditions, until the preparation has been adequately tested for any given year. In this connection we may recall the advice of Dr. George Watt contained in a communication to the *Chemist and Druggist* (Feb. 19th, 1887), in which he recommends "chemists desirous of making the very best extracts of Indian hemp to pay the full price for Bengal 'Ganja,' and to import the article from Calcutta instead of from Bombay, when there would be every chance that the defects complained of in the extract as now prepared would disappear completely." The reason of this recommendation is that the greatest care is taken in Bengal to insure that the female plants are not fertilized by the male, so that the full narcotic power of the drug may be retained. This it loses after fertilization.—*Chem. and Drugg.*

The Color of Iodine Solutions.—At a recent sitting of the French Academy of Sciences, a note on this subject was presented by M. Gautier, who has reason to believe that the difference in color is owing to a difference in the molecular state of the metalloid. In the brown solutions, like the alcoholic, for instance, the iodine molecule stands as I_2 , while I is the molecule present in carbon bisulphide and chloroform solutions.

Antipyrin and its Incompatibles.

MESSRS. E. J. MILLARD and A. CAMPBELL STARK recently reported before the Chemists' Assistants' Association of London the results of a study of the effects of combining antipyrin with all of the articles of the British Pharmacopoeia at all likely to be dispensed with it, as well as other combinations with unofficial articles. They give the following list of incompatibles as determined by their experiments:

Acid. carbolic., precipitated in strong solution.
Acid. hydrocyan. dil., yellow coloration.
Acid. nitric. dil., faint yellow coloration.
Acid. tannic., white, insoluble precipitate.
Alumen (ammonia), deep yellow coloration, fading and precipitating.
Amyl nitrite (acid), green coloration.
Arsen. iodid., precipitates.
Chloral hydras, precipitates in strong solution; no apparent action in dilute.
Cupri sulphas, solution turns green.
Decoc. cinchonæ, precipitates.
Ext. cinchon. liq., precipitates.
Ferri sulph., brownish-yellow color, deposits on standing, and solution turns red.
Glycerinum acidi carbolic., * precipitates.
Glycerinum acidi tannici, precipitates.
Hydrarg. perchlor., precipitates, soluble in excess of water.
Inf. catechu conc., precipitates.
Inf. cinch. acid., precipitates.
Inf. rosæ acid., precipitates.
Inf. uvæ ursi, precipitates.
Liquor arsenii et hydrarg. iod., precipitates.
Liquor ferri perchlor., } blood-red coloration.
Liquor ferri pernit., }
Liquor ferri persulph., }
Liquor potass. permang., reduction takes place quickly.
Sodii salicylas (solid), liquefies.
Spir. ætheris nitrosi (acid), green coloration.
Syrup. ferri iodid., reddish-brown coloration.
Tinct. catechu, precipitates.
Tinct. cinchonæ, precipitates.
Tinct. cinchon. co., precipitates.
Tinct. ferri perchlor., red coloration.
Tinct. gallæ, precipitates.
Tinct. gum. rubri (Eucalyptus kino), precipitates.
Tinct. hamamelidis, precipitates.
Tinct. iodi, precipitates, soluble in excess of water.
Tinct. kino, precipitates.
Tinct. laricis, precipitates.
Tinct. rhei, precipitates.

Dilute Acids.—With dilute acids no apparent change takes place, as with sulphuric, hydrochloric, nitric, and phosphoric acids antipyrin forms soluble compounds (Gay and Fortuné). This is well shown by dissolving antipyrin in excess in any of the above dilute acids. The solution then gives with ferric chloride a yellow coloration (or none at all) instead of the usual blood-red coloration, one of the tests for antipyrin.

The reaction said to occur when strong nitric or sulphuric acid is added to an alcoholic solution of antipyrin, we have not been able to obtain. Another statement we are unable to entirely confirm is regarding the behavior of antipyrin with phosphoric acid. We find that boiling, concentrated phosphoric acid, to which have been added a few crystals of antipyrin, gives only a faint straw coloration, whereas it has been claimed that it immediately blackens and yields an aromatic odor. This latter reaction, however, we have been able to obtain when using phosphoric anhydride, and the aromatic odor closely resembles that of salol.

Nitrites and Nitrous Acid.—The green coloration sometimes produced when antipyrin is mixed with spirit of nitrous ether has been frequently commented on. The green coloration is due to the formation of the compound isonitroso-antipyrin, a body having the empirical formula of $C_{11}H_{11}N_2O_2$ (that is, antipyrin having an atom of hydrogen replaced by NO). By the action of the acids upon this body, a small quantity of cyanogen is produced, and it is stated that unpleasant symptoms have been traced to a mixture of antipyrin and spirit of nitrous ether. According to reporters, the compound itself is inert, and the cyanogen formed from it, by the acids of the stomach, is produced in too small a quantity to be dangerous.

Isonitroso-antipyrin is only formed in the presence of free nitrous acid; a neutral spirit of nitrous ether may therefore be safely dispensed with antipyrin. But it should be remembered that ethyl nitrite is itself speedily decomposed by water, with the formation of free nitrous acid. We would therefore recommend that the occasional practice of prescribing the two together should be discontinued. The same remarks apply to commercial amyl nitrite.

Tinctures.—We found that no precipitation in any case took place with tinctures if a spirituous solution of antipyrin was employed, or if the salt was added to the tincture. The addition of water precipitated the antipyrin compound. In connection with the precipitation with

* We have left the British nomenclature unaltered.—ED. AM. DR.

astringent preparations, it should be borne in mind that antipyrin behaves with reagents exactly as an alkaloid, and is therefore precipitated by tannic acid and its congeners. The same observation applies to the astringent decoctions and infusions.

Chloral Hydrate.—The fact that chloral hydrate and antipyrin react with each other was pointed out some time ago by M. Blainville, and the reaction has since been studied by Herr Reuter.

From a number of experiments we are of opinion that this compound of antipyrin and chloral is not appreciably formed unless concentrated solutions are employed.

We conclude that the reaction is not complete in aqueous solutions, and does not appreciably take place if dilute solutions of the two bodies be employed. As the chloral-antipyrin is, according to Herr Reuter, physiologically inert, the question of its formation under the ordinary conditions likely to occur in pharmacy appears to us to be of some importance.

Mercuric Chloride.—When a solution of antipyrin is added to a solution of mercuric chloride a white precipitate occurs, soluble in excess of water. By employing concentrated solutions of the two substances, we have prepared a quantity of the compound of mercury and antipyrin. The specimen we exhibit is slightly soluble in cold, more so in hot water. It is soluble in alcohol, sparingly so, if at all, in ether, chloroform, and petroleum ether. We have been unable to crystallize it. The compound is, we believe, partially decomposed by water, the supernatant liquid from the precipitation of the compound giving at first no indication of the presence of free antipyrin (the mercuric chloride solution was purposely employed in large excess). On standing some time, however, it gave the nitrous acid reaction characteristic of antipyrin.

The mercury still exists in the compound, even after a considerable space of time, in the mercuric state, and we have been unable to find any calomel present.

Ferric chloride produces with a solution of this compound a brick-red precipitate, soluble on heating and reprecipitated on cooling.

The most remarkable character of this body is its extremely low melting point. This we find to be nearly 73° C. The melting point of mercuric chloride is 265° C., whilst that of antipyrin is 110° C. The compound turns slightly yellow upon fusing, but appears to us otherwise to remain chemically unaltered.

Calomel.—As antipyrin seemed to us occasionally to act as an oxidizing agent, we thought it worth while to investigate its action with calomel. For this purpose the following mixtures were made and exposed to diffused sunlight for a month:

1. Calomel, 4 Gm; antipyrin, 4 Gm; intimately mixed and placed in an open vessel.
2. Calomel, 2 Gm; antipyrin, 2 Gm; hydrochloric acid, 5 C.c.; and water, 50 C.c.
3. Calomel, 2 Gm.; antipyrin, 2 Gm.; water, 50 C.c.

Blank experiments containing the same proportions of calomel, water, and acid, and calomel and water, were made to experiments 2 and 3.

On examination at the end of a month, No. 2 had turned distinctly yellow, the others remained unaltered in appearance. We were unable to find any mercuric chloride present in any of them.

Sodium Salicylate.—The fact that sodium salicylate and antipyrin react when in powder has been several times pointed out. No reaction appears to take place in solution.

Iodine.—When solution of iodine in iodide of potassium is added to a solution of antipyrin, a precipitate is formed which disappears upon agitating the liquid, leaving a colorless solution, until a definite quantity of iodine is added, when the precipitate remains permanent.

A recent writer, M. Manseau, has suggested utilizing the reaction as a means of estimating the purity of a sample of antipyrin. Decinormal solution of iodine is employed, and the end of the reaction being indicated by the production of a permanent precipitate. We have examined this method and find that the production of a permanent precipitate depends upon the degree of dilution of the antipyrin solution, and is practically valueless as an indication of the termination of the reaction.—*Pharm. Jour.*

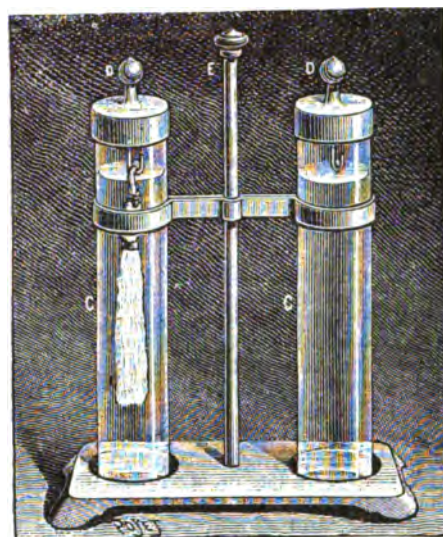
Valuation of Extract of Senega.—E. Dieterich confirms the utility of a method of valuation for extract of senega and senega root, proposed by Reuter, which consists in proving the presence of the methylic ether of salicylic acid. This is likely to be absent in old roots, and hence also in preparations made from them.

Dieterich makes the test in the following manner:

Three Gm. of extract of senega (solid) are macerated with 30 C.c. of ether during one hour, under frequent agitation; the solution is then filtered into a small beaker, mixed with 20 C.c. of water, and the ether then dissipated at a gentle heat. On adding a drop of dilute solution of ferric chloride to the aqueous residue, the liquid will assume a reddish-violet tint.—After *Helfenberger Annalen*, 1890.

DETECTING COLORING MATTER IN WINES, ETC.

THE fault of most easy methods for detection of artificial coloring of wines is that they depend upon the use of an alkali, and reveal only fuchsin or such coloring matters as are not susceptible to alkalies. Sulphofuchsin and Bordeaux red, which are destroyed by weak alkalies, are not revealed by these methods. M. Mathieu and M. Morfany have suggested a method and case of apparatus which they name "Phanofuchsin," which consists of: 1. Dyeing raw silk with the wine to be tested; 2. Treatment of the dyed silk with a reagent which affects only the natural coloring and not the artificial.



Mathieu and Morfany's Wine-testing Apparatus.

The silk used is perfectly pure raw silk, which is soaked in a 10 per-cent solution of nitric acid. It is arranged, as a matter of convenience, in tufts held by a rubber band, as shown in the figures. The reagent is composed of a neutral solution of acetate of lead, and it is into a very dilute solution of this that the dyed silk is immersed. Silk dyed by a pure wine usually turns to bottle-green, the shade depending upon the age of the vintage, while that dyed by colors derived from coal-tar, cochineal, or sorrel, becomes a decided color which is never modified.

The case contains twenty-four tufts of prepared silk in metallic cases, a bottle of reactive, two tubes closed with caps, and a support. To make a test, fill one of the tubes with wine poured directly from the bottle or through a glass funnel; attach one of the tufts of silk to the under side of the cap and suspend it in the wine for five minutes. During this time fill the second tube with water and drop into it 8 to 10 drops of the reagent. Removing the tuft of silk from the wine, squeeze it a little to remove an excess of wine, and then plunge it into the solution of reagent, whereupon the change of color follows at once.

The case also contains a number of glass tubes filled with substances commonly employed as artificial coloring, for comparative experiments.

This process is equally available for vinegars, beers, ciders, syrups, liqueurs, fruit jellies, etc.

The advantage of the method is that the change caused by the reagent produces the complementary color to the red of the wine, which is, therefore, easily distinguishable, and that it requires but a few moments of time.—From *La Nature*.

The Preservation of Syrups.

To insure the permanence of some syrups in good condition is a considerably more difficult task than preparing them even by the most complex process. Preparations of this class which contain vegetable extractive matters exhibit a proneness to ferment which the utmost ingenuity of the pharmacist is often powerless to frustrate. As soon as he wants to use one of them he finds the bottle filled with a frothy, pungent-smelling and tasting liquid, which agrees in its physical properties with nothing in the Pharmacopœia, to omit all consideration of its medicinal virtues. Under such conditions the preparation has to be boiled or strained before it is fit for dispensing, or more often it is thrown away.

How many pharmacists are there who, in the course of their experience, have more than once found the shelves of the warehouse or storeroom flooded with some sticky, half-candied liquid, the source of which was that stone or glass jar in the corner, which, shattered and neckless, tells a melancholy tale of the sad results of alcoholic-fermentation?

Within the last few years efforts have been made to avoid such catastrophes by the very heroic measure of banishing syrups altogether from stock, and filling their place with concentrated liquors, from which by simple admixture with Syrupus simplex in certain proportions any syrup can be prepared as wanted. This is a plan—certainly most effective and convenient—which does not, however, commend itself to all, especially to those who stigmatize such processes as “unpharmaceutical” and “inconsistent with the traditions of true pharmacy”; further, there are some syrups for which it is almost impossible to prepare a corresponding concentrated “liquor.”

The trouble often is partly brought about by the fact that for a few days there may be a run upon a certain kind of syrup, which may not for a long time be wanted again. The partially empty vessel stands therefore more or less securely stoppered for weeks, or even months, until, when it is required again, the contents are found to have undergone such changes as render them almost unrecognizable. In my own experience, especially in Germany, where the use of the concentrated liquors is not allowed, or at least not practised, this difficulty with the stock of syrups has been always conspicuous, and, particularly during the summer months, the greatest attention has to be daily paid to the condition of Syrupus papaveris, marrubii, mori, rosæ gallicæ, etc.

A great number of methods have been proposed for obviating this inconvenience, many of which are open to serious objection. That which I have found most useful has the merit of in no way affecting the composition of the preparation. The syrups must be stocked in very small vessels; for some kinds bottles of 2 oz. capacity will be quite large enough, and as a rule 4 oz. should not be exceeded. They must be, of course, clean and perfectly dry before filling with the liquid still hot, which is prepared by the ordinary or pharmacopœial method. Each bottle is filled right up to the top of the neck, leaving no space even for the insertion of a cork. Instead of this the syrup is fastened up in the manner described under: A number of discs of thick, felty filtering paper are cut, having a slightly larger diameter than the outer margin of the top of the bottles. One of these discs is then laid on the top of each bottle and pressed down at the edges. Of course it becomes at once saturated with the syrup. On cooling, the volume of the syrup naturally contracts somewhat, and as a consequence the disc of paper tends to be sucked in. As, however, the aqueous portion of the hot syrup quickly evaporates from the surface of the filtering paper, a crust of crystalline sugar is left behind, which is entirely impervious on the one side to air and on the other to the syrup. The latter having been introduced, after a more or less prolonged boiling, into a clean and dry bottle, we have a sterilized saccharine liquid in a bottle sealed up from the action of air or of the germs floating in it. Thus fermentation is prevented, and the only changes which can occur in the preparation will be entirely internal and such as can only be effected by modifying the nature or proportions of the ingredients. When the syrup is wanted for use the cap is readily removed with a knife.

This method of preserving syrups from fermentation is practical and practicable for all; it is effective, and does not entail the use of expensive apparatus or complicated manipulation.—H. HELBIG, in *Br. and Col. Druggist*.

The Atomic Weight of Bismuth.—Prof. Alexander Classen has made a renewed determination of the atomic weight of bismuth. The value most generally recognized at the present time is that determined by Dumas, namely, 210. Classen now shows that the method pursued by him was probably affected by errors. Other values were obtained by other investigators.

Classen's new determination yields the following value, representing the mean of nine different determinations:

208.89880, if oxygen is taken as 16.
206.37605, if oxygen is taken as 15.96.

The original paper is contained in the *Berichte*, 1890, 938.

Notes on Commercial Drugs and Chemicals.

Sugar of Milk.—Gehe & Co. report that the supply both of the handsome recrystallized sugar of milk, such as is furnished by North Germany, and of the Swiss product, exceeded the demand, which was especially large from the United States. Gehe & Co. say that sugar of milk is reported to be now also manufactured in the United States, but it is not crystalline, and only sold in powder, which is unsuited for homœopathic purposes.

Acid, Camphoric.—The use of this substance as a remedy for night sweats in phthisis and for inhalation in affections of the respiratory passages is only moderate. Recently a new substance, *camphoric aldehyde*, $C_6H_{11}CO.CHCOH$, has been patented. It is prepared from sodium-camphor and formic ether, is easily soluble in alkalies, has acid properties, and melts at 76° – 78° C. It is being experimented with at present.

Amylene Hydrate.—The use of this hypnotic has almost entirely ceased, in spite of its good effects. The chief reason appears to be its disagreeable taste, though this may be almost entirely overcome by administering the remedy in beer.

Pyretics.—As a contrast to the numerous antipyretics recently introduced, another new substance deserves mention, viz., tetrahydro-beta-naphthylamine, which has been found by Filehne to possess the property of raising the temperature of the body by several degrees. It is presumed that this compound, or others of the same nature that may be discovered hereafter, will be found of practical use in therapeutics.

Aristol.—Under this name a new patented remedy has been put on the market. It is reported to be an iodine substitution derivative of thymol, but nothing definite has, so far, been published regarding its chemical composition. It is an orange-colored micro-crystalline powder, and is proposed as a substitute for iodoform. It is already reported to excel (?) iodoform in its action as an antiseptic. Though it is not entirely odorless, it is at least free from a disagreeable odor. It will probably turn out to be a useful substitute of iodoform in some cases, but will scarcely be able to replace it entirely.

Aseptol, or orthophenolsulphonic acid, though possessing various advantages over phenol, is going out of use.

Gold Bromide has again been used more frequently—as a remedy in epilepsy and migraine—upon the recommendation of Goubert. Children are stated to bear it better than any other bromide. The dose is 0.003 to 0.006 Gm. ($\frac{1}{16}$ to $\frac{1}{8}$ grain) for children, and twice as much for adults.

Bromoform appears to acquire a steady demand, since it has been recommended by Dr. Stepp as an efficient remedy in whooping cough.

Quinine Sulphate.—Kerner's test is gradually being adopted in other countries. The new Austrian Pharmacopœia has introduced it; and also the new Dutch Pharmacopœia, which appears so much the more remarkable since it was expected that De Vrij's chromate test would be introduced. While the Austrian Pharmacopœia places the maximum limit of ammonia at 7.5 C.c., the Dutch puts it at 5 C.c., which nearly corresponds to the amount ascertained by Kerner to be required for pure sulphate of quinine. [Large manufacturers will, therefore, probably have to keep quinine of several degrees of purity in stock to supply demands for the various grades.]

Chloralamide has already passed its zenith, since it has been shown that, contrary to first reports, it has a peculiar action upon the heart.

Creolin.—The chief consumption of this substance is in veterinary practice, for mange and other parasitical diseases.

Diuretin.—As already reported by us in a previous issue, this new compound contains theobromine and salicylate of sodium. It is said to be composed of equal molecules of “theobromine-sodium” (?) and salicylate of sodium. It is a white powder of a sweetish saline, alkaline taste, soluble in half its weight of water. Both the powder and the solution must be protected from the air, since carbonic acid is apt to set the theobromine free and thus to reduce the efficacy of the compound. [Diuretin is sold at about \$2.50 per ounce at present, while pure theobromine is quoted in price lists at about \$1.00 per gramme. Even at 50 cents per gramme it would be worth about \$14.00 per ounce. There is, as yet, no reasonable relationship in price between the alkaloid and the new compound.—ED. AM. DRUGG.]

Eikonogen.—This new photographic developer, properly speaking, “amido-beta-naphthol-sulphonate of sodium,” has struck root, and is likely to stay. More recently still another compound, viz., the oxymethyl sulphonate of sodium (formaldehyde-sodium bisulphite), has been introduced. This substance, in combination with alkalies, acts as an accelerating as well as preservative agent when added to the gelatin emulsion or to the developer, no matter what the latter may consist of.

Ergotinine, either as alkaloid or in form of citrate, is scarcely used by German physicians. Bonjean's ergotin appears to maintain its old place.

Extractum Arenariæ Aquosum.—The aqueous extract

of *Arenaria rubra*, native of Algiers, has been again recommended as a serviceable remedy in vesical catarrh. The following is commended by Dr. Bertherand:

B Ext. *Arenariae Rub.* aq.....60 gr.
Glycyrrhizae Pulv.....q.s.
Fiant pil. xx.
S. Take four or five pills before bedtime.

The remedy has for a long time been used in Algiers, Malta, and Sicilia.

Hydrastinine, an oxidation product of hydrastine, has been successfully employed by Falk, in doses of three-quarters to 1½ grains, administered hypodermically, in uterine hæmorrhage. Locally it is applied in form of 10-per-cent solution of the hydrochlorate.

Hypon has almost ceased to be in demand, and will probably soon be entirely neglected.

Iodol is used by many (more than formerly) as a substitute for iodoform. It is now also employed internally in doses of 8 to 24 grains per day in scrofula, and even in tertiary syphilis.

Orexine Hydrochlorate.—Under this name Prof. Penzoldt has recommended as new stomachic a new synthetic product, viz., hydrochlorate of phenyl-dihydro-china-zoline. It is a yellowish-white, microcrystalline powder, possessing a burning, peppery taste. Its dust strongly excites sneezing. It is given in doses of 3 to 6 grains, in form of pills:

B *Orexinae Hydrochloratis*..... gr. 80
Ex. *Gentiana*,
P. *Glycyrrhizae*.
Fiant pil. 20, gelatino obtegenda.

Phenacetin is becoming more and more extended in use. The recent epidemic of influenza helped to prove its efficacy and reliability in a decided manner. Like antipyrin, it has recently been also found serviceable in whooping cough, and has also been used as an analgesic.

Sulphonal.—The consumption of this hypnotic is not as large as it was at first, but the present rate of demand is so steady that it appears to be based upon a rational restriction of the remedy to the particular class of cases for which it is really of advantage.

[It may not be generally known that sulphonal is not patented, and that the number of manufacturers in Germany alone had increased to such an extent, about a year ago, that the manufacture could only be carried on at a loss, owing to the competition and the consequent fall in price. Curious to say, this country was singled out for exploiting the new remedy for all it was worth. The monopoly is still in existence.]

A NEW SEPARATING APPARATUS.

ROBERT SCHUETZE has devised a new double separating apparatus which may be employed particularly in those analytical operations where immiscible solvents are employed.

The apparatus consists of two globes, each provided with a separate inlet, and joined by a neck containing a doubly perforated stopper. One of the perforations establishes a communication between the two globes, and another perforation passes from the end of the stopper to its centre.

By means of this, liquid may be drawn from either globe or the air pressure regulated.—After *Zeitsch. f. anal. Chem.*, 1889, 694.

A NEW GAS-WASHING BOTTLE.

THE stopper of this new gas-washing bottle, which has been devised by P. N. Raikow, has a transverse bore (a) which connects the inlet and outlet tubes (m and n). If the stopper is turned either to the left or to the right far enough so that the orifice b is exactly coincident with the tube m (in which case n coincides, of course, with the orifice c), the gas to be washed will enter the bottle through the tube P.

A simple turn of the stopper will interrupt the current.—*Chem. Zeit.*

A NEW METHOD OF EMPTYING GAS GENERATORS.

IT often happens that a current of hydrogen gas is required to be maintained for a long time, and that only a small apparatus is available. This, of course, necessitates the frequent emptying of the saline solution produced (such as sulphate of zinc, resulting from the action of sulphuric acid upon zinc), since the presence of this solution will gradually more and more prevent the action of the acid upon the metal.

In order to empty the generator without taking it apart, it has been usually customary to employ the form of apparatus shown in the figure to the right (a Woulff's bottle with three necks). Alfred C. Hertzog, however, has suggested an improvement by using a generator of the construction shown in the figure to the left. The funnel tube has a lateral outlet which is provided with a rubber and glass tube as shown. While the apparatus is generating gas, the lateral tube is either closed with a pinch-cock upon the rubber joint, or the long exit tube is raised parallel with the funnel tube. When the liquid is to be drawn off, the stop-cock at x is closed and the lateral tube opened or placed so that the liquid will be driven over by the pressure of gas still existing in the flask.—*Zeitsch. f. anal. Chem.*, 1889, 678.

REFLUX CONDENSER AND DISTILLING APPARATUS COMBINED.

A VERY simple and practical arrangement for continuous extraction with volatile solvents, and optional withdrawal of the condensed liquid, has been devised by J. Hertkorn.

In the annexed cut, only the lower end of the upright condenser is illustrated. It is to be assumed that the tube C, which may also be straight, is connected with the tube containing the substance to be extracted, while the tube A projects outward and is unconnected.

The condensing tube C has near the inner surface of the tube through which it passes a projecting branchlet m, slightly bent downward, but so that the orifice is free. The second, independent tube may either have a stop-cock G, as shown in one of the cuts, or, in place of this, its inner

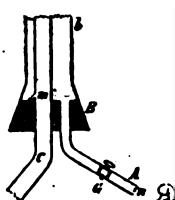
end may be closed by fusion, with the exception of a small lateral opening which is securely closed when the tube is sufficiently pulled down within the stopper, but which may be quickly rendered free by pushing it up.

As long as it is desired to have the condensed liquid flow back into the extractor, the tube A is set out of action, either by closure of the stop-cock or by pushing downward. In either case, the condensed liquid, collecting at the bottom of b, finds its way back into C through the branchlet at m. Of course, if the other tube has a stop-cock, the space above this becomes filled with the liquid. When it is desired to collect the liquid by distillation, tube A is set in action. Any liquid now collecting in b will not be able to rise high enough to pass out through m, but will pass through the tube A. [The condenser proper, that is, the portion surrounded by a current of cold water, is not shown in the cut. It properly surrounds the continuation of the section shown.]—After *Chem. Zeit.*, 13, 1220.

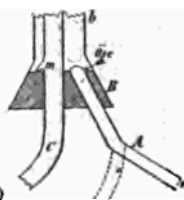
A NEW GAS GENERATOR.

A. BURGENMEISTER recommends the apparatus here illustrated for the generation of carbonic and hydrosulphuric acid.

A wide glass tube (lamp chimney, for instance) is closed at one end with a stopper through which passes a short, obliquely cut-off glass tube of about three-eighths of an inch bore, flush with the inside surface of the stopper but projecting below about one-half or three-fourths inch. Another, narrower glass tube reaches up into the cylinder about 1 to 1½ inch above the cork, while its external leg is bent up and reaches to about two-thirds the height of the cylinder. After the cylinder has been filled with pieces of marble (for generating CO₂) or with sulphide of iron (for H₂S), its upper orifice is closed with a stopper through



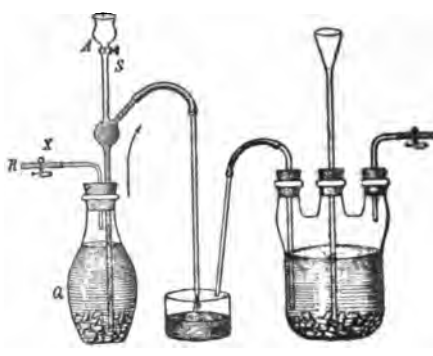
Hertkorn's Reflux Condenser.



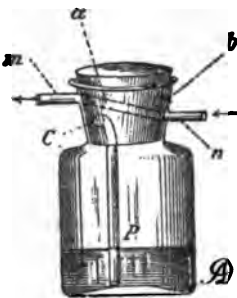
Hertzog's Gas Generator.



Separating Apparatus.



Burgenmeister's Gas Generator.



Gas Washer.

which passes the gas-conducting tube, which is preferably provided with a stop- or pinch-cock.

On immersing the apparatus thus prepared into the cylinder containing diluted hydrochloric acid, and opening the stop-cock, a steady stream of gas will be immediately evolved, and will be kept up regularly until the acid is nearly consumed.

The advantage of this arrangement consists in this: that the heavy salt solution flows off steadily through the short tube without mixing with the acid, a fresh supply of which is constantly introduced through the bent tube.

The circulation in the apparatus may be handsomely demonstrated if a little solution of litmus or other colored liquid is poured upon the acid after gas has commenced to be generated. The colored layer is seen to be drawn into the apparatus and finally to tint the dense saline solution at the bottom.—*Zeit. f. anal. Chem.*, 1889, 676.

Purification of Artificial Salicyl Compounds.

PROF. CHARTERIS, of Glasgow, has found that salicin in doses of 30 grains, salicylic acid (natural) in doses of 10 grains, and salicylate of sodium (natural) in doses of 32 grains, had no harmful action on rabbits weighing 2½ pounds; but that the artificial salicylic acid in doses of 10 grains, and artificial salicylate of sodium in doses of 18 grains, caused the death of rabbits of the same weight.

On July 4th, 1889, he discovered an impurity in the artificial acid which was very soluble and in appearance was like a coarse flour. He presumed it to be derived from creosotic acid. One grain of this impurity killed a 2-pound rabbit. It was found that this impurity could be removed as follows: Salicylate of calcium being first prepared, it is decomposed with hydrochloric acid, thus liberating salicylic acid, which is then purified by recrystallization. The appearance of the purified artificial acid was in every respect similar to that of the natural variety. The physiological action of this purified acid in 15-grain doses on rabbits was detailed. There was no paralysis, not even depression, after the last injection, and the rabbit was able to run easily. He contrasted this physiological action with that of the best samples of artificial acid obtained from Messrs. Schering, of Berlin, which in similar doses proved fatal to one rabbit, and in two others caused marked prostration and paralysis. The practical deduction to be drawn from these investigations is obvious: only the natural salicyl compounds or the purified artificial compounds ought to be given in future. In the discussion which followed, Dr. MacLagan said that many who had used sodium salicylate had seen deleterious effects from it, and had hence abandoned it in favor of salicin. He had tried many other artificial compounds of salicylic acid besides the salicylate of sodium, but he had come to the conclusion that salicin gave the best results. If the results which Dr. Charteris had obtained were confirmed by other observers, a mode of obviating these obnoxious disturbances of the heart and nervous system had been discovered; and he was willing to employ the purified artificial compounds. Salicylic acid might be prepared from a natural compound, but he questioned whether the purified artificial acid could be obtained at the price of ordinary salicin. Senator, of Berlin, had stated that salicin was broken up in the system into salicylic acid and something else, but he was not aware that any proof of this had been brought forward. His own belief was that all the salicyl compounds were antirheumatic; that salicin was the best of these, and gave rise to no unpleasant effects; and that next to this pure salicylic acid was the most valuable, but that its price was a bar to its general adoption. The benefit of these drugs was not due simply to their antifebrile powers, but they also distinctly combated the poison of rheumatism.—*Lancet*.

Notes on Essential Oils, etc.*

Almond Oil, Bitter.—The increasing demand for essential oil of bitter almonds is said to have made it more difficult to purchase a pure article. In trying to obtain supplies Messrs. Schimmel & Co. have been frequently supplied with the artificial oil, mixtures of the artificial with the natural oil being the exception. The boiling point and specific gravity afford no assistance in distinguishing between the two kinds. This is best effected by taking advantage of the fact that the artificial oil is prepared from benzyl chloride, and always retains a trace of chlorinated compounds. The process recommended is to saturate a piece of folded filter paper with the oil to be examined, and after placing it in a porcelain dish standing in a larger one, igniting it and covering it over with a large inverted beaker the sides of which have been wetted with water. The combustion gases become absorbed on the moist sides of the beaker, from which they are washed on to a filter with a little distilled water, and the filtrate, when treated with a solution of silver nitrate, should give no turbidity, much less a precipitate of silver chloride. Genuine essential oil of bitter almonds, distilled in the ordinary way from almonds or peach kernels, never gives a chlorine reaction.

Almond Oil from Peach Kernels.—The export of peach and apricot kernels from Damascus for expression of the fixed oil is said to have amounted in 1887 to 580,000 kilos, in 1888 to 500,000 kilos, and in 1889 to 575,000 kilos. Da-

mascus is the principal locality of the production, where the cracking of the shells for the removal of the kernels is done partly by hand labor and partly by machinery.

Ammoniacum Resin Oil.—A distillate from the Persian ammoniacum resin of commerce. It is described as dark yellow in color, smelling strongly of the raw material, and very suggestive of angelica oil. The yield was 0.3 per cent, the oil having a specific gravity of 0.891 at 15° and boiling between 250° and 290°.

Angostura Bark Oil.—Distillate from the bark of *Galipea Cusparia*. The yield is said to be considerably larger than stated in published works. From 100 kilos of angostura bark were obtained 1½ kilos of pure oil of yellow color and mild aromatic taste; specific gravity 0.956 at 15°.

Beechlar Oil.—This oil has come into use recently in the treatment of lung diseases. The portion used generally is that distilling between 80° and 250°, specific gravity 0.980; the greater part of this passes over between 150° and 250°, and consists to the extent of about one-third to one-half of phenols. It is thought the heavy oil, specific gravity 1.053, is probably also capable of being used. It distills between 220° and 300°, and contains about 66 per cent of phenols.

Caraway Oil and Carvol.—Messrs. Schimmel state that the products brought into commerce under the name "carvol" are frequently caraway oil from which a portion of the carvane has been removed by fractional distillation. As a means of determining the purity of carvol they indicate its solubility in 50-per-cent alcohol. Pure carvol dissolves at 20° C. in the proportion of 1 part by weight in 16 to 17 parts by weight of 50-per-cent alcohol. A sample of carvol to which 3 per cent of carvane had been added did not dissolve clear in 20 parts of 50-per-cent alcohol at 20° C. It should therefore be required that 1 part by weight of carvol should dissolve clear in 20 parts of 50-per-cent alcohol at 20° C. It is of importance to use alcohol of exactly this strength for the test, or at any rate not stronger, because with a higher concentration of the alcohol the solubility of carvane increases rapidly in a disproportionate degree.

Cinnamon-Leaf Oil (heavy).—From the Seychelles; distilled from unfermented leaves. This oil corresponds remarkably with the thin liquid cinnamon-root oil from Ceylon. Specific gravity 1.060. It consists chiefly of eugenol.

Coumarin.—In confirmation of the statement recently made by Mr. J. H. Maiden, the bark of *Ceratopetalum apetalum*, Don., an Australian saxifragaceous tree, growing to the height of fifty feet, has been found to be rich in coumarin. In a resin taken from the same tree coumarin was still more abundant. Opportunity is taken to correct a mistake in the last *Berichte* as to the equivalent of coumarin to tonka beans. It is now stated that 1 oz. of coumarin is equal to 4 lbs. of tonka beans, the maximum of coumarin occurring in fine beans being 1½ per cent.

Eucalyptol (Cineol).—Pure eucalyptol, according to Messrs. Schimmel, is characterized by a specific gravity of 0.930, a constant boiling point of 176° to 177°, and complete optical inactivity. It solidifies in a cooling mixture to long, colorless needles. It is stated that some of the products passing under the name "eucalyptol" in commerce do not possess these characters, and do not essentially differ from a well-rectified eucalyptus oil. Such products are, however, not considered suitable for use in inhalations, as the lighter boiling portions contained in them cause great irritation to the respiratory organs.

Juniper-Berry Oil.—The peculiar juniper odor of this distillate is dependent upon a substance boiling at 180°, which is probably the acetic ether of a body allied to the terpenes in the oil. The higher-boiling portion consists of sesquiterpene.

Kuro-moji Oil.—This oil is said to have come rapidly into favor, the odor recalling that of lign-aloe oil, but being far more agreeable and aromatic. It is derived from a lauraceous plant, *Lindera sericea*, Bl., named "kuro-moji" on account of the blackish color of the bark; another variety is called "shiro-moji" because of its grayish-white bark. In both kinds the white pith is surrounded by a grayish-white, silky-looking wood having an agreeable odor. This wood, which in transverse section shows delicate medullary rays, distinct annular rings, and very fine pores, is the bearer of the essential oil.

Levisticum-Seed Oil.—Distillate from the fruit of *Levisticum officinale*, the yield of oil being 1.1 per cent; specific gravity 0.935.

Musk.—Referring to the "artificial musk" that has been recently introduced, Messrs. Schimmel express the opinion that in odor it differs very much from the finer qualities of natural musk, the place of which it is not capable of taking. But although in their opinion it will find a difficult entrance into perfumery for fine extracts, they think there is a wide field for it as a soap scent and for ordinary perfumes. It is spoken of as an amorphous white powder, turning yellow when kept, readily soluble in strong spirit, less soluble in weaker spirit, from which

* From Schimmel & Co.'s April Report.

it crystallizes out at a low temperature. The addition of 10 drops of ammonia to a kilo of 1-per-cent solution is said to bring out the odor in a marked manner.

Pepper Oil from Long Pepper.—Distillate from *Piper longum*. Yield about 1 per cent of a thickish, pale-green oil, suggestive in odor rather of ginger. It is as mild to the taste as pepper oil; boils between 250° and 300°; specific gravity 0.861 at 15°.

Pimpinella Oil.—The oil distilled from the root of *Pimpinella saxifraga* has not yet been submitted to a close examination, but its specific gravity has been ascertained to be 0.959 at 15°; it begins to boil at 240°, and the thermometer then rises to 300°. A portion of the oil passes over at a still higher temperature, but undergoes strong decomposition.

Prunus Virginiana Bark Oil.—When the powdered bark of the North American "wild cherry" is stirred with warm water a volatile oil is formed, which resembles the oil of bitter almonds, consisting principally of benzaldehyde and containing a considerable quantity of hydrocyanic acid. From 79 kilos of bark were obtained 165 Gm. of oil having a specific gravity of 1.050 at 15° C.

Rosemary Oil.—The following are the specific gravities observed in a series of the best commercial distillates: Two French distillates, 0.881 and 0.883; one Spanish distillate, 0.892; seven Italian (Dalmatian) distillates ranged from 0.901 to 0.907. Two French oils having been submitted to distillation, in one instance 39 per cent and in the other 46 per cent passed over below 170°; whilst with two Italian oils, in one case only 4.5 and in the other 13 per cent passed over below 170°.

Safrol.—This compound is stated to be coming more largely into use in Europe, especially for covering the odor of soaps made from badly smelling kinds of fat. A mixture of safrol with citronella oil is said to answer very well for ordinary house soaps, and to be used by many makers instead of oil of mirbane.

Star-Anise Oil.—A statement is quoted from the circular of a firm in Hanoi to the effect that the source of all the star-anise oil in commerce is not China, as previously erroneously supposed, but the Langson Province in the French colony Tonquin, and the trade in the oil is now a French monopoly.—*Pharm. Journ.*

Solubility of Glass in Water.

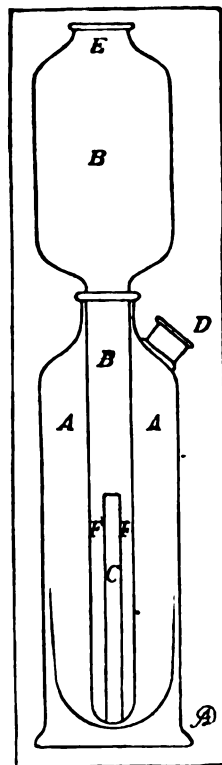
SOME time ago Messrs. Mylius and Foerster very carefully examined the solubility in hot and cold water of a large variety of glasses, and came to the following conclusions, which are given in the *Journal of the Chemical Society*:

1. Water glass is decomposed by water into free alkali and silicic acid, a certain portion (varying with the time of action, concentration, and temperature) of the latter becoming hydrated and dissolved.
2. Potash glasses are far less soluble than soda glasses, but the difference decreases with increase of the proportion of lime present.
3. Soda and potash are united in glass both to the silica and the lime. The resistance of glass towards the action of water is dependent on the presence of double silicates of soda or potash and lime.
4. Of all sorts of glass, the plumbiferous flint glasses are least soluble in boiling water.
5. The relative resistance of glasses is different towards hot and cold water.

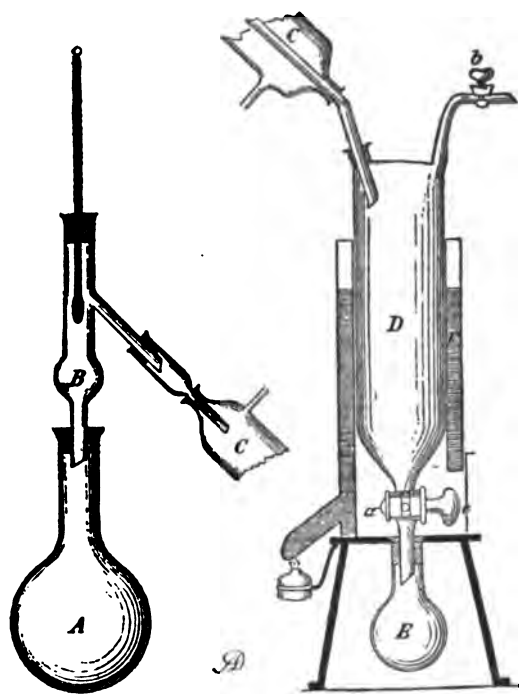
Saponated Glycerin.—Dr. Hebra, at the Vienna Dermatological Society, has read a paper, says a *Medical Press* correspondent, on the use of saponated glycerin as a vehicle for prescribing medicine, which he highly recommends to the medical profession. He described this preparation as an alkaline fat obtained in the manufacturing of soap, which is dried, then cut into small pieces and dissolved in glycerin. This product is again heated and filtered and allowed to cool, when it forms a soft, yellow, transparent, and somewhat elastic mass, which is perfectly odorless, melting at body heat and easily soluble in water. As a basis for ointments he related a number of cases successfully treated by the preparation, and expressed a hope that his colleagues would give it favorable consideration. Dr. Hebra is so confident of the efficacy of this vehicle that he asserts its potency with salicylic acid and creosote to cure that intractable disorder, lupus. His prescription is 90 per cent of glycerinum saponatum, 5 per cent of salicylic acid, and 5 per cent of creosote. This will cure lupus without the slightest pain being experienced. He also assures us that there is no other remedy so powerful as an antibactericide. This preparation is no less powerful in its curative action in tubercular skin diseases, as tyloma, lepra, etc. For the rest of the skin diseases he has different preparations, where glycerinum saponatum is the basis, and all are confidently recommended as efficacious in cutaneous disorders. He admits that he has not exhausted the different combinations with which this vehicle may be administered with as efficacious results.—*Br. and Col. Druggist.*

SULPHURETTED HYDROGEN APPARATUS.

INTO the lower vessel, A (see cut), of the apparatus a layer of glass pearls is first introduced, and afterwards 40 Gm. of sulphide of iron in pieces of about the size of a hazelnut. The vessel B is charged with 400 C.c. of mixture of 1 volume of sulphuric acid and 8 volumes of water. With this charge the 40 Gm. of ferrous sulphide will be exactly decomposed. The little tube C, which is fused into the lower part of the "flask" B, has the object of causing the heaviest part of the generated ferrous sulphate solution to flow into the space F, between the tube C (which is, of course, open below) and the walls F, F, whenever the current of gas is interrupted and the acid contained in A is thereby driven back into the vessel B. When the current of gas is allowed to pass again, the sulphate of iron solution remains in F, and fresh acid passes down through C. On again interrupting the current, the confined iron solution is displaced by one somewhat denser, and this will continue until the whole of the ferrous sulphide is used up. It will thus be seen that the object of the construction is to prevent the free mixing of the sulphate of iron solution with the acid which may still be free, thereby enabling the latter to retain its activity longer.—After *Chem. Centralbl.*, 1890, 245.



"National Pharmacopœias" is to be one of the subjects to be raised for consideration at the International Congress in the section of Pharmacology. It is questionable whether the new edition of the German Pharmacopœia will be issued by that time; it was expected to have been published before this, but it will not be a matter for surprise if the end of the year is reached before it has come into practical use.



APPARATUS FOR FRACTIONAL DISTILLATION UNDER DIMINISHED PRESSURE.

E. VALENTA has devised the apparatus here described for conduction distillations in which the distillate is apt to solidify on cooling. It is especially intended for the fractional distillation of such bodies as fatty acids. The apparatus consists of a flask, A, with bulb thermometer tube, B, connected to the condenser C C, which passes into the receiver D. This is surrounded by a water jacket, kept at a certain temperature by the flame of an alcohol or other burner. The receiver is connected with a small flask, E. Whenever it is desired to remove any of the distillate—which is kept in a liquid condition by the hot water—the stopcock *a* is opened and the desired quantity withdrawn. At *b* the receiver is put in communication with the filter pump, by means of which a suitable vacuum is produced, which at the same time lowers the temperature at which the substance in the flask boils or distills over.—*Chem. Centralbl.*

A New Process of Salt Manufacture.

FEW persons, except those conversant with the salt industry, would suppose that the manufacture of that important commodity is carried on at the present time in precisely the same way as when salt was first made—namely, by evaporating brine in open pans. These pans are now, and for centuries past have been, made of wrought iron, and are of quadrangular form, and range in area from 600 to 1,000 square feet, and in depth from 12 inches to 16 inches. Beneath these pans are three or four furnaces, according to the size of the pan, and as the salt is deposited on the bottom of the pans it is fished out of the brine and removed for moulding and drying. But there is always a greater or less deposit of salt left on the bottom plates of the pans, particularly over the furnaces, and this deposit, combining with the salts of lime and magnesia in the brine, forms a hard scale upon the plates, which causes them to rapidly burn away and to buckle, or bend. Salt pans are, therefore, constantly under repair, and the finer the salt made the heavier are the repairs, the life of a salt pan averaging about three years. The brine, moreover, leaks from the pans into the furnaces, and results in the production of gases which are alike deleterious to animal and vegetable life. It is true that attempts at improvement have often been made, as, for instance, evaporating the brine in revolving cylinders over a fire, but success has not attended the trials of these methods, so that in general the production of salt is effected after the primitive fashion of our remote ancestors—namely, by open evaporation. This process, moreover, is a very slow one, and the output is comparatively small in proportion to the area occupied and the quantity of fuel used. A salt works running some seven or eight pans will give an average output of 80 tons per week of salt made from brine containing 1 pound 14 ounces of salt per gallon. In every respect, therefore, an improved process has long been greatly desired.

The attempts which have been made to modify the ordinary pans and furnaces have resulted in such a small increment of success, as regards improved results of working, that it has long been evident that improvement could only be the outcome of a radical and thorough change. This change has now been effected by Dr. Sigismund Pick, of Szczakowa, Austria, who has for many years past devoted his attention to the subject in connection with chemical manufactures. Dr. Pick's process is simple, automatic, and continuous, and, whilst requiring only about two-fifths of the fuel at present necessary for the manufacture of salt, can be worked with a minimum of unskilled labor. Moreover, the apparatus being worked under vacuum, and heated by steam instead of by fire, the wear and tear is practically *nil*, whilst the products are of the highest quality and the output exceptionally rapid and large. The secret of success lies in being able to materially quicken the process of production without risk of damage to the products, and without increasing the absolute heat, but rather by reducing it, and at the same time reducing the expenses both of working and maintenance. The invention depends for its success upon two circumstances mainly. The first is that the boiling point of any liquid is lowered by reducing the pressure under which evaporation is carried on, and the second that the steam generated by the evaporation of any liquid contains a certain amount of latent heat, which is sufficient to evaporate another quantity of liquid, provided the boiling point of the latter is below the temperature of the steam used. Dr. Pick's apparatus is made in three separate but duplicate sections, each section consisting of four main and closely connected parts. These are the heating chamber, the boiling chamber, the collecting chamber, and the filtering chamber.

The three sections are placed side by side, a few feet apart, and they are connected together by pipes. The first section is in communication with a steam boiler, or with the exhaust steam from an engine, while the third section is connected with an air pump and condenser. Each of the three sections having been charged with brine, steam is admitted to the heating chamber of the first section, heating the brine in it. The steam given off from that brine enters the steam chamber of the second section and heats the brine in that section, the steam from which goes to the heating chamber of the third section and heats the brine therein. A vacuum being maintained in the three sections by a pump, boiling or evaporation is carried on at the reduced temperature due to that vacuum. The salt as it is precipitated settles in the collecting chamber, and thence is admitted at intervals into the filtering chamber. Here the brine, which is carried forward with the salt, is automatically returned to the boiling chamber, and the crystallized salt is withdrawn, moulded, and dried for the market. The brine from the tanks is supplied automatically to the boiling chamber of each section, and the processes of evaporation and production are simultaneous and continuous.

The successful working of the system does not depend upon the adoption of the three sections, for salt has been and is being made equally well in one, although by no means so economically as when the complete set of three is used. In order, however, to demonstrate the practical

value of Dr. Pick's invention in this country, a single section, with its boiler, air pump, and condenser, has lately been erected at a salt works in Staffordshire under the superintendence of Mr. Perry F. Nursey, C.E. This plant, the working of which had been previously proved by Dr. Pick in Austria, has now been running for some little time past, with thorough practical success as a salt producer. It is only a small plant, capable of turning out about 1 ton per day of twenty-four hours from fully saturated brine—i.e., brine containing 2 pounds 6 ounces of salt per gallon. This output it has been yielding regularly ever since it was fairly started to work. The charge of salt is drawn every hour without stopping the action of the apparatus, and the salt thus produced is of the finest quality. With a complete plant of three sections of larger size the output would be 50 tons of salt per day of twenty-four hours at a calculated cost of 2s. 6d. per ton for labor and all other expenses. By the ordinary system of open pans the cost of production ranges from 9s. per ton under the most favored circumstances to 12s. per ton where less favorable conditions obtain.

The advantages of the new system appear to be obvious. In the first place there is a great saving in fuel, especially where exhaust steam is available. The present consumption of coal in the ordinary pan process is stated to be 12 cwt. per ton of fine white salt. Even where exhaust steam is not available for the new process, the consumption of coal is less than 4 cwt. per ton of salt. Another important advantage is the absence of frequent repairs and the small amount of wear and tear. These items alone, in the ordinary method of salt manufacture, add seriously to the cost of production, not only in themselves, but by reason of the loss occasioned by long stoppages. Then there is the saving in labor. In Dr. Pick's system six men and two boys, formed into two twelve-hour shifts of three men and a boy per shift, are sufficient for working a plant having an output of 50 tons per day of twenty-four hours. Other advantages are the absence of smoke and deleterious vapors, and the great economy in space occupied. A 50-ton per day plant only occupies an area equal to that covered by a salt pan producing 40 tons per week.

From the experience gained with the present plant, Dr. Pick appears to have succeeded in supplying to the salt trade a factor which, by materially reducing the cost of manufacture, must benefit not only the maker and the consumer, but must regain for England what looks very much like a departing industry. In illustration of this it may be mentioned that whereas in 1888 there were 898,671 tons of salt shipped from this country, the shipments during 1889 fell to 666,796 tons, a decrease in one year of 231,875 tons, or, in other words, a loss of more than one-fourth of the export trade in salt. When it is remembered, too, that the exports of chemicals from this country, in the manufacture of which salt constitutes one of the principal items, stands at present at £2,000,000 per annum, it becomes apparent that but for the introduction of Dr. Pick's process, or of some equally efficient system, it may be expected that the decrease in the export of salt shown last year will be repeated, if not exceeded. It would appear as though, after years of research, Dr. Pick has brought his investigations to a practical issue at a very important juncture in the history of salt manufacture. The working of the new process has been investigated by leading chemical experts, and has been witnessed by a number of salt manufacturers. They one and all admit the great advantages the system embodies, and have moreover expressed the opinion that it promises to revolutionize one of our great national industries.—*Br. and Col. Druggist*, from *The Times*.

Artificial Musk.

REGARDING this new synthetic substance, the last report of Gehe & Co. contains the following remarks.

The reluctance of European purchasers (to put in a stock of natural Tonquin musk, which has reached the market in larger amounts than formerly) is probably due to the artificial musk which has recently appeared on the market. The inventor of the process has sold his patent for a large sum to parties in France, whence alone the market is supplied with the new product (Musk "Baur") at a price of 3,000 francs per kilo.

The artificial musk is prepared by heating toluol with a mixture of chloride, bromide, or iodide of butyl in presence of aluminium chloride, and then converting the product into a nitro-compound.

Artificial musk appears in form of white crystals which are easily soluble in 94% alcohol and possess a fine musk odor, particularly when the solution is diluted with water and mixed with not too small a quantity of ammonia. Acids interfere with the odor. The same is the case with an alcoholic solution, which is apt to turn acid spontaneously. Since musk is often to be combined with oils having an acid reaction, this will probably interfere with the usefulness of the new substitute. It is also said that the latter lacks the fine flavor, intensity, and persistence of the genuine musk.

Some Notes on Alkaloidal Assays.

In the course of a paper on the alkaloidal assay of certain narcotic and other drugs and preparations derived from them, Mr. E. Dieterich (in *Helfenberger Annalen*, 1889) has occasion to criticise several of the recently proposed methods of determining alkaloids in such cases. His remarks will also be of interest to our readers.

It should be stated first that Dieterich has found, and already so reported, that the lime-ether process of extracting alkaloids (mixing the powdered drug with lime, drying, and extracting with ether in a constant extraction apparatus) is preferable to other methods.

This method was likewise favorably reported upon by Beckurts and Poehl, but unfavorably by Kremel.

More recently Cavendon advised to come back to the old method of determining the quantity of alkaloids from the amount of precipitate obtained by Mayer's solution. But it is well known that this method is affected with various drawbacks. In the first place, the amount of precipitate is in direct ratio to the concentration of the liquid; and then, again, the composition of the precipitate varies according to the concentration of the liquid.

Another method was proposed by Van Itallie. Its practical application to nux vomica is as follows: Dissolve 2 Gm. of extract of nux vomica in water, with addition of a few drops of sulphuric acid to produce a distinctly acid reaction, macerate during one hour, add 10 C.c. of solution of acetate of lead (1:10), and filter through a dry filter. To 20 C.c. of the filtrate add 5 C.c. of diluted (1:25) sulphuric acid, allow to settle, filter again, and mix 20 C.c. of the filtrate with ammonia until the liquid is alkaline. Now shake it three times with an equal volume of chloroform, unite the chloroformic extracts, and distil off the chloroform, when the alkaloids will be left behind as a yellowish mass. Dissolve this in 15 C.c. of $\frac{1}{10}$ normal acid, and retitrate the excess of acid with $\frac{1}{10}$ normal alkali.

For determining the alkaloids in the extracts of aconite, belladonna, conium, hyoscyamus, etc., the same author uses the following modified process:

Dissolve 5 Gm. of the extract in water, with addition of 10 drops of diluted sulphuric acid to make 50 C.c., macerate one or two hours, add 25 C.c. of solution (1:10) of acetate of lead, mix 50 C.c. of the filtrate with 10 C.c. of diluted (1:25) sulphuric acid, and filter. Render 50 C.c. of the filtrate alkaline with ammonia, shake three times with an equal volume of chloroform, unite the chloroformic extracts, remove the chloroform by distillation, and dry the residue. Dissolve this in 5 C.c. of diluted alcohol and titrate with $\frac{1}{10}$ normal acid. In the case of conium, alkalinity must be produced by means of potassa, and ether must be used for extraction. The author also directs to add 2 C.c. of water to the united ethereal extracts (in the case of conium) before the ether is distilled off.

E. Dieterich has had this method carefully examined in his laboratory, and, to check the results, has made a parallel series of experiments with the lime-ether process, since it was previously proven that the shaking-out process (with chloroform, ether, etc.) never extracts the whole of the alkaloid.

Since Dieterich suspected that the heat employed in distilling off the chloroform destroyed some of the alkaloid, he made another series of experiments in this way. He divided the united chloroformic extracts, in each case, into two portions. In one of these the chloroform was distilled off. In the other it was allowed to evaporate spontaneously, being also carefully protected against the influence of burning lights. [It has been shown that when chloroform vapors are given off in a room in which there are burning lights, there are some highly irritant bodies produced, among them chlorocarbonic acid.—Ed. AM. DRUGG.] The result of the three series of experiments is as follows:

Extract of	Van Itallie's Process.		Lime-Ether Process.
	Distilled to dryness.	Spontan. evaporated.	
Aconite.....	0.25%	1.28%	1.40%
Belladonna.....	0.23%	0.77%	1.21%
Hyoscyamus.....	0.05%	0.19%	1.30%
Nux Vomica.....	17.10%	17.47%	17.47%

While it will be seen that the effect of heat, in evaporating the chloroformic extracts, is a decided loss in alkaloids, even the second series, in which no heat was used, shows that the shaking-out process does not succeed in extracting all alkaloids. An exception is nux vomica, where the heat seems to affect the alkaloids but little, and where the shaking-out process seems to be as reliable as that by continuous extraction.

The new Dutch Pharmacopoeia, which directs the shaking out of the solution of the extracts of nux vomica with chloroform, likewise commits the error of prescribing the evaporation of the chloroform over a water-bath, and to dry the residue at 100° C.

Beckurts uses a modified method. He dissolves the extracts with water containing a little alcohol. On render-

ing the solution alkaline with ammonia, and shaking it with chloroform, the latter extracts the alkaloids more readily than when alcohol is absent.

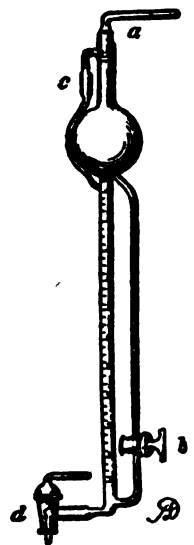
But Dieterich shows that even here all heat must be avoided in the evaporation of the chloroform. If this is done, the results approach more closely to those obtained by the lime-ether method.

Beckurts raised an objection against Dieterich's lime-ether process as applied to nux vomica. He claimed that ether was a poor solvent for strychnine and brucine.

But Dieterich has found that, while this may be true as regards the already isolated alkaloids, it is not the case when the alkaloids are freshly liberated from their natural combinations. When the mixture of extract of nux vomica and caustic lime, which has been packed in the extraction apparatus, is first treated with ether, it will be noticed that the first drops of percolate are so loaded with alkaloid that the partial evaporation and cooling which each drop experiences during its falling upon the bottom of the flask is sufficient to allow the alkaloids to crystallize out, so that they will render the bottom layer turbid. On rotating the flask, however, the alkaloids readily dissolve in the succeeding portions of ether.

RESERVOIR BURETTE.

SCHIFF recommends a so-called reservoir burette for liquids which it is intended to bring in contact with air as little as possible. When the reservoir has been filled and the stop-cock *b* is opened, the liquid enters the burette, in which it rises, displacing the air, which escapes through the tube *c*. The tube *a* leads to a large stock bottle (if desired) containing a sufficient supply of the volumetric solution.—After *Chem. Centralbl.*



The Testing of Insect Powder.

DR. H. THOMS, of the laboratory of J. D. Riedel's chemical works in Berlin, contributes to the *Pharmaceutische Zeitung* an interesting note on the falsification of insect powder. According to the writer, the consumption of flower stalks and so-called "false flowers" for the preparation of insect powder equals, if it does not exceed, the quantity of genuine flowers employed for that purpose. According to reliable statistics there were sold on the Trieste market, in January last, 84 tons of genuine flowers, 60 tons of stalks, and 22½ tons of so-called "false flowers." The latter are quoted regularly in certain price lists at about 20s. per cwt., and the exportation of "flower stalks" from the Dalmatian ports is so large that whole shiploads are sent out at a time. It should be added that, according to another authority quoted by the *Pharmaceutische Zeitung*, these stalks are exported from Trieste, not so much for the purpose of being ground abroad and mixed with genuine flowers, as for specific use, in the form of a coarse powder, by skin and fur dealers. Some time ago a sample of "false flowers" was identified by the firm of Cæsar & Loretz, wholesale druggists of Halle-on-the-Salle, in Germany, as belonging to *Chrysanthemum leucanthemum*; but Dr. Thoms now refers to a specimen obtained by him from Trieste which is believed to belong to *Pyrethrum Indicum*. The whole flowers of Messrs. Cæsar & Loretz's sample, when tested, were found to leave 8.03 per cent, and the powder yielded 10.106 per cent of ash containing a small proportion of manganese. Dried at a temperature of 100° the sample lost 10.85 per cent of moisture, the total percentage of ash in the dehydrated sample being therefore equal to 11.38. Dr. Thoms' *Pyrethrum Indicum* flowers, tested in the same way, yielded respectively 9.08 and 9.79 per cent of manganese ash, and lost 7.76 per cent of moisture by drying at 100°. It should be added that the flowers were fully developed ones, which yield a smaller percentage of ash than closed flowers. Previous tests of water-free samples of undoubtedly genuine whole flowers of *Chrysanthemum cinerariæfolium* had yielded an average of 6.93 per cent, and ditto powdered flowers of 6.944 per cent of ash. Dr. Thoms, although admitting that a sample of insect flowers which leaves over 8 per cent of ash is suspect, is careful to add that not too much importance should be attached to such a test only. The chemical composition of the ash must also be taken into account, in proof of which he mentions a sample of insect flowers, of splendid appearance, which were offered to his firm by a Trieste house at the rate of only 7d. per pound. The water-free samples of these flowers yielded only from 6.84 to 6.94 per cent of manganese ash, which also showed a slight proportion of chromate of lead. The sample did not possess the characteristic flavor of insect flowers, and was quite devoid of insect-killing power. Not even all genuine flowers yield an effective powder; in those which have been gathered too early the aroma has not been fully developed, and in flowers which are too old the aromatic principle is lost.—*Chem. and Drugg.*

Forensic Search for Alkaloids and Allied Bases.

From a paper by Dr. Anton Seyda on the "Detection and Estimation of Poisons in Bodies," we take the portion treating on the detection of alkaloids, from the *Analyst*, May, 1890:

The testing of organs for alkaloids is, as is well known, one of the most difficult chemical problems, which fact will be admitted by every analyst of long standing and experience. Our imperfect knowledge of the ptomaines, and the conditions necessary to their formation and disappearance, makes it very difficult to judge about the alkaloidal nature of a substance. There has already been such an amount of literature about ptoma-coniine, ptoma-strychnine, etc., that I should not wonder to notice one of these days a pamphlet on the preparation of strychnine, morphine, etc., from putrefying white of egg. It is argued, with much truth, that a nitrogenous base, isolated from organs, is only then to be pronounced a vegetable alkaloid when it possesses all its physical, physiological, and chemical properties. Of course, in such a case there is no fear of its being a ptomaine; but alkaloids are generally present in such small quantities that it is mostly impossible to get all reactions satisfactorily, and I feel sure that many a too-particular analyst has in consequence been induced to call vegetable alkaloids ptomaines.

It certainly is much easier in the present state of science to pronounce a residue to be a ptomaine instead of an alkaloid, for the simple reason that one rarely succeeds in isolating the base from the organ in a perfectly pure condition.

The best way to extract the alkaloids is by means of an alcoholic solution of tartaric acid. The fat which separates out scarcely deserves any further attention, although it is not quite impossible that it may act as a solvent for organic poisons (for instance, nitroglycerin; in the absence of fatty matter this is best isolated by extracting the air-dried substance with chloroform, finally drying the extract over sulphuric acid); but it mostly consists for the greater part of cholesterol. The extracts got from a stomach are mostly of a bright yellow color, more particularly if there was an abundance of bile; but organs containing much blood give extracts of a much darker color, and should therefore be analyzed separately.

A clarification of the solution may be attempted by adding alcoholic solution of tartaric acid as long as a precipitate forms. The filtrate is evaporated, the residue taken up with water and then nearly neutralized with potash. On adding alcohol the potassium tartrate is precipitated, carrying down a good deal of the coloring matter.

After evaporating off the spirit, the watery fluid is once more tested as to its reaction, and, if necessary, neutralized with potash. As it is difficult to get perfect neutrality, it is best to use very delicate litmus paper, working until only the faintest acidity is noticed. Before using the regular course, one must never omit to test a little of the solution for meconic acid, and also to notice its behavior towards iodic acid. If no iodine is liberated (acidify the fluid with tartaric acid), it is no use trying for morphine; but of course a separation of iodine does not in the least prove the presence of that alkaloid, as other bodies may cause the reaction. The fluid is now divided into three parts. Part 1 is made alkaline with potash, and distilled in a current of steam or hydrogen. The distillate is to be especially tested for nicotine, coniine, and aniline, which is done best by first shaking it with ether and evaporating this in a current of air, the flask containing the solution being surrounded with water of 70°-80° C. When about 10 C.c. of ether are left, it is put, to spontaneously evaporate, in a small beaker. The residue is dried in vacuo over sulphuric acid, and then made into a neutral hydrochloride (coniine hydrochloride is of characteristic appearance). If necessary, the usual tests for nicotine may be supplemented by preparing the double salts with gold or platinum chloride, and submitting these to a quantitative analysis.

If no volatile bases have been found, the second portion is shaken out: 1. With ether, both from acid and alkaline solution. 2. With chloroform from alkaline solution. 3. With amylic alcohol after addition of ammonium hydrate, but this is only necessary if the iodic acid test has been successful. Before shaking with the chloroform, any ether must be expelled by gentle warming and blowing, and before using the amylic alcohol any chloroform must be likewise got rid of.

If reactions are got which point to the presence of a particular alkaloid, a special process is applied to the third part of the fluid. It is a good plan to add solution of mercuric chloride, which precipitates every trace of nitrogenous base in twenty-four hours. The deposit is washed with a weak solution of sublimate, and the alkaloid is then isolated in the usual manner. The residues left after evaporation of the ether, chloroform, and amylic alcohol must always be dried over sulphuric acid; they are partially amorphous and crystalline, colorless, or of a yellow or brown color. Froehde's reagent is often reduced with a blue color, to which, however, not much importance must be attached. The same may be said of the passing green color obtained with a sulphuric acid solu-

tion of ammonium vanadate. The residue from the alkaline ether will nearly always get violet on warming with syrupy phosphoric acid, although this test has been supposed to be characteristic for aconite only. The otherwise so splendid atropine test of Vitali (treating the pure alkaloid first with fuming nitric acid, and then with alcoholic potash) will, however, mostly fail with the impure residue. The same failure is sure to occur on applying the chromic acid test (getting an agreeable odor).

As a test for strychnine, ammonium vanadate has lately been strongly recommended, and found trustworthy. The experiment is best performed in two ways. First of all, the solution of the vanadate in sulphuric acid is dropped on to the alkaloidal residue; and, secondly, solid vanadate is first added, and the whole moistened with sulphuric acid. This test is preferable to the time-honored test with bichromate, at least when the alkaloid is somewhat colored.

I must now call attention to an important fact, as far as I am aware not yet published, viz.: Colocynth resin gives with vanadate solution a reaction almost like strychnine.

If this drastic (colocynth) is suspected, I proceed as follows: The residue is mixed with a pinch of powdered bichromate with addition of a few drops of dilute sulphuric acid (1:2). At a little distance a little strong sulphuric acid is placed, and the two liquids drawn together with a glass rod. A beautiful violet-red is thus obtained which gradually increases in color. If vanadate is used instead of bichromate, a blue color is first obtained and a violet-red afterwards.

The residue obtained by evaporation of the amylic alcohol (which must first be passed through a dry filter) is often impure, and is best purified by treatment with alcohol. The morphine is then tested for by the ordinary reagents, or it may be tested after conversion into apomorphine.

Chloroform: Its Reactions and Tests.*

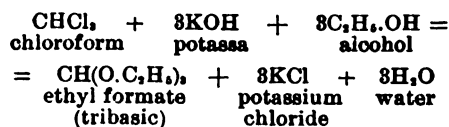
1. CHLOROFORM is a colorless and clear, neutral liquid of an agreeable ethereal odor and a sweet taste. Its spec. grav. at 12° C. is 1.5039. It boils at 61.2° (142° F.), and it melts (that is, after it has been frozen by artificial cold) at -70° C. (-158° F.). Its solubility in water is 0.64 parts in 100 at 18° C. With ether and alcohol it mixes in all proportions.

2. It is not inflammable. But when it is mixed with alcohol it burns with a smoky flame. If much alcohol is present, the flame is luminous and surrounded by a green margin.

3. If chloroform vapor is conducted through a red-hot tube, the chloroform is decomposed, with formation of dense white fumes. The products of combustion are: perchlorobenzol (which attaches itself in form of needles to the cooler parts of the tube), hydrochloric acid, and free chlorine. The latter is easily detected by conducting the vapor through solution of iodide of potassium.

4. The chlorine present in the chloroform molecule cannot be detected by silver solution. But on mixing chloroform in a capsule with twice its volume of alcohol, then adding powdered caustic potassa or soda, and igniting the mixture, the chlorine will be found in the residue combined with potassium or sodium, and may then be detected by silver solution. Chlorine can also be withdrawn from chloroform by nascent hydrogen (zinc and sulphuric acid).

5. On warming chloroform with alcoholic solution of potassa, it is converted into ethyl formate:



To prove the presence of formic acid, the alcoholic solution is diluted with water, the alcohol dissipated by evaporation on a water-bath, the residue mixed with phosphoric acid and then distilled. The distillate will contain the formic acid.

6. Chloroform easily dissolves fats, resins, caoutchouc, and phosphorus. Iodine dissolves in it, forming a purple solution; if alcohol is present, the solution has a brownish tint. On shaking such a solution with water, the alcohol is abstracted from it, and the chloroform then assumes a pure violet color. If ether is present in the chloroform, iodine colors the liquid likewise brownish. On adding water it depends upon the proportion of each liquid how the separation takes place. If only a little ether is present, chloroform containing some of this ether will be separated and sink to the bottom. But if much ether is present a layer of ether containing chloroform will form on top.

If chloroform is to be separated from alcohol or ether (in mixtures), this is best done by fractional distillation. If only a small quantity of alcohol is present, the mixture

* After G. VORTMANN, "Anleitung zur chemischen Analyse organischer Stoffe," 8vo, Leipzig und Wien, 1890.

is shaken with water, the resulting layers separated, and each layer distilled separately. The aqueous portion first passing over (after the more volatile liquids) still contains a little chloroform.

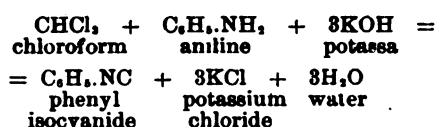
The alcohol which is present in the aqueous layer may be detected by the iodoform test. This is best performed as follows:

Iodoform Test for Alcohol.—Into the liquid containing alcohol, and which has been gently warmed, introduce 5 or 6 drops of a 10-per-cent solution of potassa, then a solution of iodine (1 part of iodine, 1 of iodide of potassium, and 10 of water) until the liquid acquires a faint brown tint, which is then made to disappear by addition of 1 drop of the potassa solution. This will result in the separation of iodoform, which is easily recognized by its odor, its crystalline form, and by Lustgarten's test. The latter is as follows: On putting into a test tube some fragments of caustic potassa, then adding a few drops of phenol and afterwards a few drops of an alcoholic solution of iodoform, and gently warming, a red mass will result which is soluble in alcohol with a carmine color. The iodoform test for alcohol is, however, not conclusive as to the alcohol being the sole cause, since many other organic compounds will produce the same result as alcohol. However, in the case of chloroform it may safely be assumed that alcohol alone is the cause of the reaction.

Alcohol may be determined in chloroform also by A. C. Oudemann's method. About 7 to 10 C.c. of the chloroform to be examined are poured into a flask, and an excess of pure and dry cinchonine added. (The cinchonine is obtained by precipitating a solution of cinchonine with ammonia.) The flask is placed for some time upon a water-bath at a temperature of 17° C., being occasionally shaken; the liquid is then filtered in a funnel covered with a plate of glass, 5 C.c. of the filtrate transferred to a tared capsule, evaporated on a water-bath, and the dry residue weighed. The amount of the latter determines the quantity of chloroform in the original sample.

Residue from 5 C.c. of the solution prepared at 17° C.	Percentage by weight of alcohol in the chloroform.
0.021 Gm.	0 per cent.
0.067 "	1 "
0.111 "	2 "
0.152 "	3 "
0.190 "	4 "
0.226 "	5 "
0.260 "	6 "
0.290 "	7 "
0.318 "	8 "
0.343 "	9 "
0.366 "	10 "

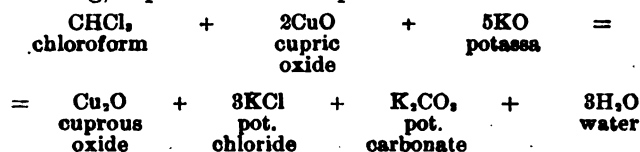
7. On putting into a test tube some aniline, adding alcoholic solution of potassa, afterwards some drops of chloroform, and gently warming, a violent reaction takes place, with production of phenyl-carbamine (phenyl isocyanide, which is isomeric with benzonitril), which can easily be recognized by its very disagreeable odor. (This is known as Hofmann's isocyanide reaction; also sometimes called benzonitril reaction.) The reaction is as follows:



8. On dissolving alpha- or beta-naphthol in solution of potassa, adding a few drops of chloroform, and warming, the solution acquires an intensely blue tint (Lustgarten). Addition of alcohol promotes the appearance of the color; much water destroys it.

On diluting the solution with much alcohol it turns green.

9. On adding chloroform to Fehling's solution and warming, cuprous oxide is separated. The reaction is:



Nearly all bodies which, when heated with caustic potassa, produce chloroform, such as chloral, trichloroacetic acid, compound perchloric ethers, etc., likewise reduce the cupric salt.

10. On dissolving a little resorcin in alcohol, adding solution of potassa, then a few drops of chloroform, and warming, a liquid of a magnificent yellowish-red color results, which acquires a violet shade when strongly diluted.

If chloroform is heated with a little (about 0.05 Gm.) of resorcin and much solution of soda, a red-colored liquid is obtained, which becomes colorless upon addition of an

acid. Supersaturation with an alkali reproduces the red color.

But on heating chloroform with an excess of resorcin and only a little soda solution, a yellowish-red liquid is obtained which has a strong yellowish-green fluorescence, even when highly diluted. The red color appears to be due to the formation of sodium rosolate.

11. On developing hydrogen gas from pure zinc (free from iron and sulphur) and sulphuric acid, at a temperature not exceeding 30° C., drying the gas by passing it over calcium chloride, allowing it to issue from a platinum point and igniting it, it burns with a colorless flame, and on bringing a copper wire into the flame the latter is not tinted. If, however, any liquid containing chloroform be introduced into the hydrogen apparatus, the chlorine of the chloroform is converted, in the hydrogen flame, into hydrochloric acid, and contact of a copper wire with the flame will color the latter blue.

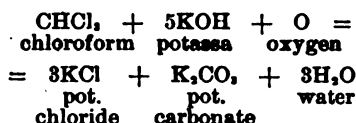
On conducting such hydrogen gas containing chloroform vapor over a freshly prepared mixture of thymol and caustic potassa, the mixture acquires a handsome reddish-violet color, particularly when warmed.

12. **Quantitative Determination of Chloroform.**—The following three methods are the best known:

(a) **Baudrimont's Method.**—Add a weighed quantity of the chloroform or of the liquid containing it (but which must contain no other substances capable of reducing cupric to cuprous oxide) to Fehling's solution in a strong bottle, stopper well, and heat it for some hours on a water-bath so that all odor of chloroform shall have disappeared on opening the bottle. Then filter, and either determine the quantity of cupric oxide still in solution, or that of the separated cuprous oxide. Every molecule (2 atoms) of copper corresponds to 1 molecule of chloroform. The results are satisfactory.

(b) **L. de Saint Martin's Method.**—Boil a suitable quantity of the liquid containing chloroform with alcoholic potassa under an upright condenser, dilute the liquid with water, dissipate the alcohol by heat, dissolve the residue in water, and determine the chlorine, now combined with potassium, either gravimetrically or volumetrically.

(c) **[Vortmann's Method].**—Transfer a suitable quantity of the liquid to a strong bottle, add solution of potassa and solution of permanganate of potassium of known strength, stopper the bottle well, and heat for two or three hours on a water-bath so that all odor of chloroform shall be gone when the bottle is opened, which must not be done until the bottle has become cold. Now add iodide of potassium and hydrochloric acid, and determine the separated iodine by means of volumetric hyposulphite. If the permanganate has likewise been standardized by the same hyposulphite, the difference in hyposulphite required for saturating the amount of permanganate added, and that required for neutralizing the iodine separated, corresponds to that quantity of iodine which is equivalent to the permanganate consumed in producing formic acid by oxidation:



Hence 2 atoms (1 mol.) of iodine correspond to 1 molecule of chloroform.

The Yearly Opium Consumption of the World.

CHINA, the chief consumer of opium, produces, according to recent reports, nearly 225,000 piculs, that is, 13,612,500 Kgm., or nearly 30,000,000 pounds of opium. Although Chinese law interdicts the cultivation of opium, yet this is a dead letter, since it is openly cultivated everywhere, particularly in Szechuen. But the above figure is far from representing the amount consumed in China. On taking a survey over the chief places of opium production, we will find that the East Indies produce about 6,000,000 kilos, half of which comes from the districts of Patna and Benares, and the other half from that of Malwa. The next largest place of production is Asiatic Turkey, the crop being about 400,000 kilos. Persia contributes about 200,000 kilos. Other places of production are too insignificant to be taken into consideration, and we may, therefore, assume that the total quantity exported from all countries of production amounts to about 6,600,000 kilos, or 14,520,000 pounds.

Of this amount there are imported into China about 5,000,000 kilos of East Indian and 300,000 kilos of Turkish and Persian opium, making 5,300,000 kilos altogether. Other countries import as follows: England, about 275,000; the United States, 250,000; Dutch East Indies, 170,000; Siam, 50,000; Cochin China, 50,000; Philippine Islands, 25,000; Australia and Polynesia, 25,000 pounds.

These figures show that the home production of opium in China is far greater than double the whole exportation from all other countries. The total annual home consumption of opium in China may therefore be reckoned to be about 19,000,000 kilos, or 41,800,000 pounds.—After *Gehe & Co.'s April Report*, 1890.

Clear and Permanent Mucilage of Gum Arabic.

H. HELBIG, after commenting (in the *British and Colonial Druggist*) on the difficulties in the way of making a clear mucilage of gum arabic that will keep even for a short time without the addition of antiferments, says:

It is necessary that a glass-stoppered bottle should be used, of such a capacity that the gum and water, when introduced in the proper proportion, shall quite fill it, so that when the stopper is *in situ* (not being so placed until adhering air bubbles have been removed from the gum by gentle gyration of the vessel) all air shall be completely excluded. It is naturally somewhat difficult to hit the right quantities of gum and water to use in order to fulfil this condition at the first trial; but when they have been once determined by experiment, the figures are entered in the note book and used as guides in all subsequent operations.

By avoiding contact of the mixture with air, in the manner described, and by conducting the solution at the lowest possible temperature, all the possible precautions against premature decomposition have been taken. It only remains to allow solution to take place.

But this is not most rapidly effected by merely allowing the bottle to stand on the counter and giving it an occasional shake. Under such conditions the gum forms a semi-solid, homogeneous mass at the bottom of the water, which no amount of shaking will disturb. Of course the glass rod must not be called into requisition, primarily because it cannot be introduced into the full bottle without displacing a portion of the contents, and further, because by opening the vessel in this way we should stultify all our previous precautions to prevent the access of air.

The best way to proceed is first to shake together the gum and water, having secured the stopper with string, and then allow the bottle to rest on one side. After a time it is taken up and inverted—i.e., is allowed to stand on the stopper, supported in any convenient manner. As there is no air space in the bottle, no portion of the gum is out of contact with the water when the bottle is turned upside down—an important factor. The gum, therefore, gradually falls, by virtue of gravity, in the form of "strings" through the water, and is quickly dissolved. A repetition of the inversion two or three times will be sufficient to perfect solution in much less time than could be possibly effected by the common method of stirring occasionally, with a glass rod or a pestle, the mixture of gum and water contained in an open dish or mortar.

The last operation is straining. This should be done by means of fine flannel, not previously moistened with water, as is generally supposed to be advisable. This material will be found to give a brighter solution with no more trouble than muslin (the meshes of which soon became blocked with impurities and dried gum); and if the finished product is filled into small bottles and securely corked, it will be found to keep well for an almost indefinite time, at least as long as will be required in any average pharmacy.

Synthetic Carbolic Acid.

SOME experiments have been made by Dr. Ohlmüller, assistant in the Imperial German Health Department, to test the relative disinfecting power of the "synthetic" carbolic acid (*Pharm. Zeit.*, 1890, 142).

The sample examined, solidified at a moderate temperature to greasy needles that reflected light strongly, had a specific gravity of 1.0681, and melted at 41° C. With the exception that the compound gave a faintly acid reaction with blue litmus paper, it corresponded to all the requirements of the *Pharmacopœia Germanica*. The comparison was made with ordinary official carbolic acid, as well as two varieties of crude carbolic acid—oily and tarry—mixed with sulphuric acid, and the estimate of their relative power as disinfectants and antiseptics was based upon their antibacterial action. The conclusions arrived at were, that there is a difference in the disinfecting power of the two kinds of carbolic acid, since the synthetic acid diminished the life activity of the bacteria experimented upon rather less than the older kind, but that the difference was so small that the two kinds might be considered to be practically of the same value.

The disinfecting action of the mixture of crude carbolic acid and sulphuric acid was found, however, to be greater than that of either of the purer acids used alone.—*Pharm. Journ.*

Pyoktanin.

THIS is the name of a new powerful antiseptic (meaning literally "pus killer"). All antiseptics of any value heretofore known or used were either poisonous or had some other disagreeable properties.

Recently Prof. Stilling, of Strassburg, discovered the fact that certain aniline colors are capable of destroying bacteria in the living organism. He has examined a large series of these bodies, and finally selected two which possess the desired properties in a high degree. There is one drawback connected with them, however—namely, that they are strong coloring agents. On the other hand, they are non-poisonous, odorless, and far exceed bichloride in their antiseptic effects. They not only prevent

but also arrest all pyogenic processes, and promote the healing of wounds and sores.

The apparent drawback of the tinctorial power of the agent is overbalanced also by the fact that the surgeon can the more easily control and insure its application to the parts requiring treatment. Any stains produced by pyoktanin in places where it is not wanted may readily be removed by Javelle water or alcoholic solution of soap.

Merck has received the sole agency of pyoktanin from Prof. Stilling and Dr. Wortmann. There are, for the present, two kinds of pyoktanin in the market, one being blue (*Pyoktaninum caeruleum*) and the other yellow (*Pyoktaninum aureum*). The former is more specially intended for general surgical, and the latter for ophthalmological, purposes.

It is used (in both colors) in form of dusting powder (2 per cent and 1 per cent), salve, pencils, troches for making solutions (each with 1 Gm. or of 0.1 Gm. of pyoktanin), and fabrics impregnated with 1 per cent of the agent.

Orexine.

THE commercial article known under this name is really the hydrochlorate of a new synthetically produced, non-oxygenated basic substance possessing powerful tonic, stomachic, and appetizing properties. It has the formula $C_{11}H_{11}N_3HCl \cdot 2H_2O$.

The hydrochlorate is a yellowish-tinted semi-crystalline powder, and produces sneezing as urgently as salicylic acid during manipulation. It has a pungent and anæsthetic after-taste, not so persistent, however, as to preclude its combination with aromatics to form a very palatable elixir.

It is soluble in 20 to 25 parts of water at 60° F., and gives a white pulverulent precipitate with ammonia, insoluble in excess, but freely soluble in ether and chloroform. The salt is insoluble in ether, and with ammonia the base separates, not as an oily, afterwards crystallizable alkaloid, as has been said, but in the manner stated above.

The dose is 2 to 10 grains, in capsules, pills, or cachets, followed by a quantity of liquid to neutralize its pungency.—*Pharm. Journ.*

Exalgine.

THERE has been an increased demand for this new remedy in Edinburgh. One or two cases of severe cyanosis followed by collapse had almost forced it into oblivion when Professor T. R. Fraser published some results obtained by using small doses. Since then it has been in great demand, in powders containing 2 to 8 grains and also in mixtures, such as:

R Exalgine grs. xxiv.
Sp. Vini Rect. 3 iij.
Aque ad 3 iij.
Solve.

Also in capsules and pills containing—

R Exalgine grs. ij.
Ext. Belladon gr. 1/4.

Should it be generally prescribed, I predict a number of dispensing difficulties, for its solubility is just sufficiently equivocal to tempt prescribers to order it dissolved, and added, as it is sure to be later on, to incompatibles.—*Pharm. Journ.*

Oil of Wintergreen.

THERE are three kinds of oil which go by this name—viz., the oil distilled from the leaves and twigs of *Gaultheria procumbens*, the oil obtained by distillation from the bark of *Betula lenta*, and the artificial or synthetic oil. There have been differences of opinion between authorities regarding these oils, and now Professor F. B. Power seeks to set the differences at rest by reviewing the whole subject at some length in the *Pharmaceutische Rundschau*. Selecting the facts given therein we find that the following are the characteristics of the three oils:

	True oil.	Birch oil.	Artificial oil.
Sp. gr.	1.1885	1.1851	1.1898
Boiling point.....	218–221°C.	219–221°C.	221–223°C.
Sp. rot. pow.	–2° (for 200 Mm.)	nil	nil

A chemical examination of the oil led to the following conclusions: The natural oil of wintergreen consists of methyl salicylate, with small amounts (0.3 per cent or less) of a terpene, which is the optically active constituent. The oil of birch, when pure (it is often adulterated with kerosene), consists simply of methyl salicylate. The synthetic oil, as manufactured, does not contain any trace of benzoic acid, and cannot be distinguished from either the natural oil of wintergreen or the oil of birch by the addition of an excess of a cold solution of potassium hydrate.—*Chem. and Drugg.*

A New Iodine Test Paper.

EGMONNET recommends to prepare iodine test paper in the following manner: Impregnate unsized paper with solution of iodide of potassium, and another piece with tartaric acid and iodate of potassium. Place equal strips of the two papers together, with a strip of thin, plain paper between them, and keep the whole wrapped up in parchment or gutta-percha paper. When paper thus prepared is moistened with water, the tartaric acid decomposes the iodate of potassium, setting hydriodic acid free, and this, with the iodic acid, produces free iodine. A piece of paper $9\frac{1}{2} \times 4\frac{1}{4}$ inches can set as much as 0.3 Gm. of iodine free—that is, about three times as much as can be introduced into the same surface by tincture of iodine. The liberation of iodine lasts for a considerable time, usually about forty-five minutes.—*Neueste Erfind.*

Cocaine Phenate.

COCAINE phenate was recommended by Viau two years ago for local anæsthetic purposes, especially in dentistry. He used it in 86 cases without a single untoward result. According to Merck, the same salt of cocaine is now being applied to other purposes, Professor Von Oefele having found that it is an excellent antioatarrhal and general anodyne. In nasal catarrhs associated with difficulty of hearing, antifebrin, with the addition of 5 to 7 per cent of cocaine phenate, is used as a snuff, and the same powder is taken internally in 15-grain doses for gastric catarrhs. In conjunctival catarrhs it may be applied in various forms; for example, in 1-per-cent solution, in 30-per-cent alcohol, and the same solution is applicable for the relief of all local pains. Cocaine phenate is, we may add, a slightly colored salt of the consistence of honey; it has a faint odor of carbolic acid, and dissolves readily in proof spirit. It contains about 75 per cent of cocaine.—*Chem. and Drugg.*

Hectograph Pad.

DR. AD. JOLLES published in the *Pharmaceutische Post* an analysis of a hectograph which gave 150 sharp copies and did not require recasting or washing. It had a composition indicated by:

Gelatin	9.12
Glycerin	59.17
Residue (inorganic ash).....	0.61
Water.....	81.10
	100.00

Sugars, gums, acid and alkaline constituents were specially looked for, and their absence demonstrated. The gelatin was evidently (from the ash-content) "skin gelatin" in contradistinction to "bone gelatin, or glue." Taking into consideration that the above figures represent anhydrous constituents (which are not met with in commerce), the mass is prepared by digesting 11 parts of gelatin, parchment glue, or similar good kinds of skin gelatin, for some hours with 24 parts of water. Then allow the whole to liquefy in an oven and add, as soon as the gelatin has dissolved and the mixture is uniform, 65 parts of glycerin (90 per cent). After thorough mixing of the whole the liquid can be poured into the form. It is necessary, of course, to avoid the formation of air bubbles, and to allow the mass to set for twenty-four hours before it is used.—*Br. and Col. Drugg.*

Damage by Disinfection with Sulphur.

DR. H. R. CARTER, of the U. S. Marine Hospital Service, mentions a number of the disadvantages attending disinfection by means of sulphurous acid. Sulphur burnt in the presence of moisture may have the following undesirable effects: It injures the colors of many woollen goods, being especially hard on greens and bright reds—a red flannel shirt, for instance, always comes out yellow, sometimes the color is not affected; the dark blues are generally absolutely uninjured, but not rarely turned a reddish brown. The same color, of course, may be from very different dyes and thus give different results. The quality of the dye, as judged by the price of the fabric, is no criterion of how it will behave under sulphur. Clothes that have been worn are frequently discolored, when new ones, of the same nature, are but little or not at all affected, doubtless protected by the oil used in weaving, which has not worn off. Dr. Carter has seen but few colored goods, other than woollen, submitted to sulphurous acid gas; in some instances they were bleached.

Articles containing starch, if not washed soon, are corroded—this is especially true of handkerchiefs, etc., and the cloth covers of books. Blankets and hair pillows, which are utterly unsuited to the process, will retain for about a week a smell so disagreeable, in no sense like that of burning sulphur, that they are unpleasant to use. This persists in spite of airing and exposure to the sun, but is immediately removed by washing, or heating in an oven.

Flour in ordinary barrels will not "rise" with yeast for some days after exposure, and this effect penetrates for a considerable distance in the barrel. Tea is ruined permanently, as is ground coffee. The same charge is made of its effect on smoking tobacco.

All metal work, save gold, is tarnished, with consequent injury to watches, clocks, etc. Oil prevents this almost entirely. Apples and other fruit become scalded and worthless.

The gas in Dr. Carter's observations was obtained by burning as much sulphur as possible in the presence of abundant moisture in a compartment more or less close, kept closed for from twenty-four to forty-eight and occasionally seventy-two hours. In general it was not possible to enter the compartment for some time—thirty minutes to an hour—after opening up. Where the apartment is more open less injury would be done, and also less efficient disinfection.—*Jour. Amer. Med. Assoc.*

Purification of Glycerin.

JOS. BRUNNER thus writes to the *Monde Pharmaceutique*: As is known, the impurities of commercial crude glycerin consist of nitrogenous substances and fatty acids soluble in water (acetic, butyric, caprylic, etc.), and derived from bone fats and rancid oils used in the original processes. The process of purification proposed by the author is based on the property of zinc oxide to unite with these substances and form insoluble compounds.

The author proposes to operate as follows: To 1,000 parts of crude glycerin add 80 parts anhydrous zinc sulphate, heat, let cool, and when cold add 27 parts of caustic lime in powder. Filter under pressure.

The hydrated zinc oxide which is formed combines with the brown coloring matters and forms insoluble lakes, and insoluble basic salts with the fatty acids. The lime sulphate being almost insoluble in glycerin is almost entirely precipitated, and if absolutely pure glycerin is needed the little residue may be disposed of by passing a stream of carbonic acid through the filtrate and refiltering. The portion of zinc oxide remaining in the glycerin is disposed of by a stream of hydrogen sulphide.

Instead of zinc sulphate, the sulphates of magnesium, aluminium, iron, or copper may be used, and the quicklime may be replaced by carbonate of baryta.—*Nat. Drug-gist.*

Detection of Cottonseed Oil as an Admixture.

E. DIETERICH reports in the *Helfenberger Annalen*, 1889, that he can confirm Wesson's statement regarding the failure of Becchi's nitrate-of-silver test when applied to cottonseed oil after it has been heated. Becchi's test has been modified in various ways. Leone recommends, in place of a feebly acid solution of nitrate of silver, a solution containing 1 per cent of the salt and one-half per cent of nitric acid. Pattison modifies Becchi's test by directing an alcoholic solution of nitrate of silver to be poured into an ethereal solution of the fat. Ritsert recommends to boil the fat with an equal volume of a 2-per-cent alcoholic solution of nitrate of silver during five to eight minutes. Wesson made two important observations. First, that a coloration of the fat (lard) by the silver nitrate indicated the presence of cottonseed oil only when metallic silver was separated; and, secondly, that cottonseed oil which has been heated so that it emits fumes during one or two minutes, or through which a current of air has been passed during several days, no longer exerted any reducing action upon nitrate of silver.

This fact, which is now confirmed by Dieterich, of course renders Becchi's nitrate-of-silver test practically useless. When it actually produces a visible reaction, the presence of cottonseed oil is demonstrated; but the absence of the reaction proves nothing.

Hirschsohn has proposed a test for cottonseed oil by means of chloride of gold. This has likewise turned out to be useless, in the case of cottonseed oil which has been heated.

Probably the most reliable, though a rather circumstantial, method of detecting cottonseed oil in lard is that proposed by Muter and Koningh. This consists in saponifying the fat, precipitating with subacetate of lead, separating the lead soap, extracting from this the oleate of lead by means of ether, and decomposing it by hydrochloric acid. Finally, the "iodine number" (see this journal, 1889, 80) of the oleic acid is determined. According to Muter and Koningh, that of pure lard is 93.66, and that of cottonseed oil 136.69.

In the case of olive oil Dieterich relies chiefly upon the elaidin test and the iodine number to insure the absence of cottonseed oil. He found the iodine number, in the case of green olive oil, between 80.7 and 84.7; in the case of prime oil between 81.2 and 83.2.

Honey of Roses.—M. Daenen communicates to the *Journal de Pharmacie de Bruxelles* a method of preparing what he describes as "honey of roses, a transparent, rose-colored, and deliciously odorous article." Infuse 100 Gm. of red rose petals, bruised, in 400 C.c. of boiling, distilled water for six hours. Strain, and submit the petals to a further infusion for another six hours in a fresh charge of 200 C.c. of boiling water, and, if this does not entirely exhaust them, to a still further infusion in another charge of boiling water. Mix the infusions, evaporate to 170 Gm., filter, and to the filtrate add 330 Gm. of white sugar and 500 Gm. of clarified honey.

A Paraffin Float for Burettes.—In place of Erdmann's float for reading off the level of liquid in burettes, irrespective of its curved meniscus, N. Wolff recommends to use small discs of paraffin, about 2 Mm. thick, and a trifle less in diameter than the bore of the burette. These discs are made by melting some paraffin in a beaker of hot water so that a layer of about .2 Mm. thick is formed, then allowing to cool, and cutting out the discs by means of a cork-borer.—*Chem. Zeit.*, 13, 389.

Cement for Pestle Handles.—Professor W. A. Viall, of the Department of Pharmacy, Cornell University, states (in the *Nat. Druggist*) that a good cement for fastening porcelain or wedgewood pestles to wooden handles may be prepared by working litharge with glycerin to a stiff paste. This should be applied to the wooden handle, and care taken that a close joint is made at the point of union, so that none of the matters triturated with the pestle may lodge there and contaminate the next batch.

Manufacture of Iodoform.—Suillot and Raynaud prepare iodoform in the following manner:

A solution is first prepared containing 50 parts of iodide of potassium, 6 parts of acetone, and 2 parts of caustic soda in about 1,000 parts of water. To this is added, under constant stirring, a dilute solution of chlorinated soda (hypochlorite of sodium) in drops. Iodoform is at once produced, and is formed as long as there is any iodide and acetone present. The solution finally left behind contains neither chloroform nor an iodate, but acetate of potassium and caustic soda. The yield is very nearly equal to that producible by theory. The precipitation of the iodoform is not hindered by the presence of various neutral alkali salts. The inventors make use of this fact by working, not with a pure iodide of potassium, but with a solution of kelp ash deprived of sulphides and sulphites.—*Chem. Zeit.*

Cyanide of Zinc and Mercury.—This new compound, in which cyanide of mercury is only mechanically contained, and which was first suggested and introduced by Prof. Lister as a very powerful antiseptic, is now manufactured by Merck and may be procured in the market. It is made after the process of Prof. Dunstan, described (after *Pharm. Journ.*) in our last April number, page 66, and contains about 36 per cent of mercury cyanide. It is a white, micro-crystalline powder, completely insoluble in water, and without any action upon the skin.

Cyanide of zinc and mercury is a powerful agent for preventing the development of bacteria, but it is almost devoid of bactericidal properties. Hence, if it is to be used in surgical antiseptics, it ought to be combined with bichloride. Fabrics which are afterwards to be impregnated with cyanide of zinc and mercury should, therefore, first be treated with a solution (1 in 4,000) of bichloride.

A New Expectorant.—According to Dr. Schoengut in the *Centralblatt für Therapie*, a new expectorant, the tincture of naregamia, has been tried in the clinic of Professor Drasche, of Vienna, in twenty-four cases. The drug was used in doses of from 1 to 3 Gm. daily, according to the following formula:

B Tinct. Naregamia.....1.0-30 Gm.
Laurel Water.....10-20 "

D. S. 10 drops at every hour.

The Tinctura naregamia is derived from a plant which is found in Goa, viz., *Naregamia ulata* W. et A. The drug has proved useful as an expectorant, particularly in those cases in which there was much coughing with little secretion, or when expectoration was made difficult by thick, tenacious mucus. In cardiac cases, in two of which the heart was fatty, complicated with catarrh of the air passages, the tincture of naregamia proved very efficacious. This was also true of pulmonary emphysema, and only in the case of a woman suffering from marasmus, and who had been subject to dyspepsia, vomiting occurred on each occasion even after small doses. In cases of tuberculosis, expectoration was occasionally facilitated. In pneumonia the drug was used in the stage of resolution, with copious crepitant rales; it was well borne, and favored expectoration. The drug had no effect on the circulation, the digestion, or the urinary secretion, and no toxic symptoms were observed.—*Br. and Col. Drugg.*

Sulphaminol.—A new patented medicinal chemical has been put on the market recently under the name sulphaminol. Properly speaking, it should be designated as a "surgical chemical," since it has antiseptic properties, and appears to have been used, so far, only externally or hypodermically.

The true chemical name of this compound is thio-oxydiphenylamine. It is produced by acting with sulphur upon aqueous solutions of any of the salts of meta-oxydiphenylamine. The product is a light yellow, odorless, and tasteless powder, insoluble in water, easily soluble in alkalies, less easily in alkaline carbonates. It is also soluble in alcohol and in glacial acetic acid, forming light

yellow solutions. When heated it turns brown, and melts at about 155° C.

In contact with the liquids of the body sulphaminol splits into its two constituents, sulphur and phenol.

It has been found an efficient agent for antiseptic treatment, and has also proved a powerful deodorant.

Further reports are promised.

Oubain, derived from an African plant which the negroes use as the source of an arrow poison (see *AMERICAN DRUGGIST*, p. 195, for 1888), has been used by Dr. Gemmell, of Glasgow, Scotland, as a remedy in 49 cases of whooping cough. He recommends a solution of which 1 drop represents $\frac{1}{1000}$ grain of the glucoside, which dose may be taken every three hours by a child five years of age. Gemmell says that it cuts short the disease when used in the first stage, diminishes its severity when used during the second stage, and in the third stage hastens convalescence.—*Br. Med. Jour.*

[The first stage of whooping cough is difficult to distinguish from an ordinary bronchitis. There is no standard by which to judge of the severity of the second stage, as it is more severe in some cases than others, without regard to treatment, and the same may be said respecting the duration of convalescence. Of the author's cases 25 recovered, 4 died, and 20 were still under treatment, so that, so far as results can be judged, rather more cases proved fatal than is usual. Moreover, it is not advisable to give remedies generally whose dose is $\frac{1}{1000}$ of a grain, and of which $\frac{1}{1000}$ grain kills a frog. If we had a child sick with whooping cough, we would prefer to take our chances with the whooping cough rather than with the disease plus oubain.—*Ed. AM. DRUGG.*]

Paraguay Tea.—Of the productions peculiar to the soil of Paraguay, yerba (*Ilex Paraguayensis*)—in Guarani called *mi*—is the most important. It is derived from the twigs and the leaves of a bushy evergreen tree which is scattered more or less thickly through the wild forests of the central cordillera, from north to south. The districts in which it is most abundant are hence termed yerbales, and are named from their locality. The chief are the yerbales of Chiriguano and Tacurupytá, in the extreme north; of Concepcion at the head of the Ypané; of Caaguazú and Tacurupucú, on the shed to the Paraná; and of Yuti and Jesus in the south. At present the yerba is not a cultivated product. In former times, however, the Jesuits recognized the great advantages and conveniences of having the yerba close at hand, and made large plantations of the tree about the southern reductions, there being a grove at Santiago of not less than twenty thousand yerba trees at the end of the last century. The trees of the far northern yerbales yield a finer tea than those of the south of Paraguay, and the yerba of Chiriguano is stated to be the best of all. This, from its remoteness, has never been worked, and the yerba of trade is chiefly derived from the districts of San Pedro and Rosario. Formerly the yerbales were a Government monopoly, and yielded a large part of the Government revenues. The southern fields were granted to Messrs. Escobar & Co., on January 1st, 1880, for a period of ten years, on favorable terms. In return for this concession the company have built roads, which have, after a certain time, become the property of the public.

Yerba is the dry and powdered leaf of the *Ilex Paraguayensis*, a tree bearing a close resemblance to the orange tree. It has not the delicacy of flavor, while it has more bitterness and astringency than China tea. The Paraguayan yerba is considered to be superior to that grown elsewhere.—*Chem. and Druggist.*

Persian Gum as an Adulterant.—Professor Sickenberger writes to the German pharmaceutical papers on the subject of the adulteration of true acacia gum with the insoluble Persian gum, obtained from a variety of plum-tree which has lately been frequently imported into Europe. The Persian gum is often of beautiful appearance, but in its natural state it is quite insoluble, though it may be rendered soluble by a special treatment known as "Jules Meyer's process." Professor Sickenberger suggests that the plant yielding this Persian gum is either the *Prunus bokharensis* Royle, or the *Prunus Puddum* Roxburgh. According to him the gum, which is largely exported from Bushire, on the Persian Gulf, either direct or via Djeddah, to the small ports at the Egyptian side of the Red Sea, is carried from the latter places to Assouan, Cairo, and other Egyptian markets, and there used to a very large extent as an adulterant of the Soudan gums. As it was thought quite improbable, from geographical reasons, that any gum coming from Egyptian centres should be adulterated with insoluble Persian gum, the fraud lasted a considerable time before it was discovered.

Suppuration Following Use of Cantharides Plaster.—Owing to the troublesome suppuration sometimes following the use of cantharides plaster, and the reported growth of *Staphylococcus pyogenes aureus* in a tube of sterilized nutrient fluid inoculated with material derived from a cantharides plaster, the editor of the *Lancet* questions the desirability of employing powdered cantharides (as in the case of the plaster) in preference to liquid preparations.

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EDITORIAL.

A BILL is before Congress (Senate No. 279, House No. 8248) which has for its purpose the prevention of interstate commerce in or the importation of adulterated food and medicines. That there is need for some such control we must all admit, in view of the fact that it has led to the enactment of laws, in many of the States, providing legal standards of strength and purity, and penalties for their infringement, and that some legal restrictions have long been imposed upon the importation of poor drugs. Just how the general government can consistently undertake the control of this matter in other ways than it already exercises through its customs laws is the problem to be solved.

It would appear that the right of the general government to regulate commerce between States is the only ground upon which the constitutionality of such national laws can rest, and it is doubtful whether this will be a sufficient warrant for any law that can be of practical value.

The bill referred to provides for the establishment of a food division in the Department of Agriculture, with a chief and inspectors, chemists, and other employees, who are charged with the procuring and analysis of foods and drugs sold in States other than the ones in which they are manufactured. It provides for monthly publication of the results of such inspections, including the names of manufacturers and brands of adulterated articles; prohibits the importation of adulterated food or drugs, and the intentional shipment, delivery, receipt, or sale of fraudulent goods.

To enable the Department to have definite information respecting the persons engaged in manufacture for interstate commerce, and the nature of their wares, as well as to provide a guarantee for the products of legitimate enterprise, and to raise the money for the administration of this division of the Department, such manufacturers are required to obtain a license and use an approved label. The portion of the bill which especially concerns pharmacists reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, that the introduction, for purposes of sale, barter, or exchange, into any State or Territory from any other

State or Territory or foreign country, of any article of food or drugs which is adulterated within the meaning of this act, is hereby prohibited, and any person who shall wilfully and knowingly ship or deliver for shipment from any State or Territory or foreign country to any other State or Territory, or who shall knowingly receive in any State or Territory from any other State or Territory or foreign country, or who, having so received, shall deliver, for pay or otherwise, or offer to deliver to any other person, any such article so adulterated within the meaning of this act, shall be guilty of a misdemeanor, and for such offence be fined not exceeding \$200 for the first offence, and for each subsequent offence not exceeding \$500, or be imprisoned not exceeding one year, or both, in the discretion of the court.

Section 2. That any person who shall knowingly ship or deliver for shipment from any State or Territory to any other State or Territory or foreign country, or shall knowingly receive in any State or Territory, or who, having so received, shall deliver, for pay or otherwise, or offer to deliver to any other person, any compound article of food or compounded drug which is not accompanied by the label, brand, or tag as hereinafter provided, shall be guilty of a misdemeanor, and for such offence be fined not exceeding \$200 for the first offence, and for each subsequent offence not to exceed \$500, or be imprisoned not to exceed one year, or both, in the discretion of the court: Provided, that in case of articles of food or drugs manufactured for export it shall be lawful to use such brands or labels as may be distinctive or descriptive of the article, although such brands or labels do not contain the words "mixture" or "compound."

Section 3. That any person who shall wilfully apply to any compound article of food or compounded drug a label, brand, or tag, or order or permit another person to apply the same, for the purpose of allowing the said article or drug to be introduced into any State or Territory, or for the purpose of export to a foreign country, which label, brand, or tag shall falsely describe said article or drug in any of the particulars called for by this act, shall be guilty of a misdemeanor, and, on conviction, shall be fined not to exceed \$300.

Section 4. That the term "food," as used in this act, shall include every article used for food or drink by man other than drugs or waters. The term "drug," as used in this act, shall include all medicines for internal or external use.

Section 5. That for the purposes of this act an article shall be deemed to be adulterated,

In the case of drugs—

1. If, when sold under or by a name recognized in the United States Pharmacopoeia, it differs from the standard of strength, quality, or purity, according to the tests laid down therein.

2. If, when sold under or by a name not recognized in the United States Pharmacopoeia, but which is found in some other pharmacopoeia or other standard work on materia medica, it differs materially from the standard of strength, quality, or purity, according to the tests laid down in said work.

3. If its strength or purity fall below the professed standard under which it is sold.

In the case of food or drink—

1. If any substance or substances has or have been mixed or packed with it so as to reduce, or lower, or injuriously affect its quality or strength, so that such product, when offered for sale, shall be calculated and shall tend to deceive the purchaser.

2. If any inferior substance or substances has or have been substituted wholly or in part for the article, so that the product, when sold, shall be calculated and shall tend to deceive the purchaser.

3. If any valuable constituent of the article has been wholly or in part abstracted, so that the product, when sold, shall be calculated and shall tend to deceive the purchaser.

4. If it be an imitation of and sold under the specific name of another article.

5. If it be mixed, colored, powdered, or stained in a manner whereby damage is concealed, so that such product, when sold, shall be calculated to deceive the purchaser.

6. If it contain any added poisonous ingredients or any ingredient which may render such article injurious to the health of the person consuming it.

7. If it consist of a whole or any part of a diseased, filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal, or an animal that has died otherwise than by slaughter: Provided, that an article of food or drug which does not contain any added poisonous or injurious ingredient shall not be deemed to be adulterated in the following cases: 1, in the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food under their own distinctive names, and not included in definition 4 of this section; 2, in the case of articles labelled, branded, or tagged so as to plainly indicate that they are mixtures, compounds, combinations, or blends, and which do not violate the provisions of subdi-

visions 6 and 7 of this section; 3, when any matter or ingredient has been added to the food or drug because the same is required for the production or preparation thereof as an article of commerce in a state fit for carriage or consumption, and not to fraudulently increase the bulk, weight, or measure of the food or drug or conceal the inferior quality thereof; 4, where the food or drug is unavoidably mixed with some extraneous matter in the process of collection or preparation; 5, in the cases prescribed and exempted in and by section 3436 of the Revised Statutes of the United States.

Section 6. That no person shall be convicted under the provisions of this act if he shows to the satisfaction of the court before whom he is charged that he did not know that the article of food or drug was adulterated within the meaning of this act, and that he could not with reasonable diligence have obtained that knowledge.

Section 7. That any article of food or drug which shall be imported into the United States contrary to law shall be forfeited to the United States, and shall be proceeded against under the provisions of chapter 18 of title 13 of the Revised Statutes of the United States, and such imported property so declared forfeited may be destroyed or returned to the importer for exportation from the United States, after the payment of all costs and expenses, under such regulations as the Secretary of the Treasury may prescribe; and the Secretary of the Treasury may cause such imported articles to be inspected or examined, in order to ascertain whether the same have been so unlawfully imported.

Section 8. That it shall be the duty of the several United States district attorneys to prosecute all violations of this act which shall be brought to their knowledge, in the same manner as other offences against the United States are prosecuted.

Section 9. That nothing in this act shall be construed as modifying or repealing the provisions of chapter DCCXXI of the acts of the first session of the Forty-ninth Congress, entitled, "An act defining butter; also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarin," approved August 6th, 1886.

Section 10. That whenever the President of the United States shall be satisfied that there is good reason to believe that any importation is being made, or is about to be made, into the United States from any foreign country of any article of food or drug that is adulterated within the meaning of this act, he may issue his proclamation prohibiting the importation of such article.

Section 11. That whenever the President of the United States shall be satisfied that unjust discrimination is made by or under the authority of any foreign government against any product of the United States, he may direct that any or all products of such foreign government so discriminating against any product of the United States shall be excluded from importation into the United States, and in such case he shall make proclamation of his direction in the premises and therein name the time when such proclamation against importation shall take effect, and after such date the importation of the articles named in such proclamation shall be unlawful. The President may, at any time, revoke, modify, terminate, or renew any such proclamation as in his opinion the public interest may require.

Section 12. That this act shall take effect ninety days after its passage.

A careful reading of the text as given above will show that it is capable of much improvement and that it should undergo decided modifications before it is allowed to become a law. Committees of the National Wholesale Drug Association and of the Philadelphia Drug Exchange have already met, resolved, sent delegates to Washington, reported, resolved further, and will doubtless prevent the enactment of the bill as it stands. Meanwhile, some of our contemporaries seem more inclined to use billingsgate and abuse than sober argument when speaking of the measure; and this is to be regretted, for it is calculated to impress the promoters of the bill with a belief that the arguments against it and the needs for modification are not of much account, and that the writers are following the advice given by a sagacious lawyer to his pupil, that when his client had "no case" on which he could base an argument before a jury, he should abuse the counsel of the opposite side.

It is hardly necessary to offer any comments at present upon the bill as above given, since it has been stated that a committee of druggists, which lately had a hearing before the Senate Committee, were informed that the bill had been entirely remodelled and its objectionable features removed.

A MEDICAL CONTEMPORARY thus expresses its views on what it conceives to be the question of standardization:

"It is proposed to standardize fluid extracts so that they will be of nearly equivalent strength, or perhaps to have two series of preparations, but each of the same strength. In this way much confusion and danger from wrong dosage will be avoided, while an enormous burden upon the memory will be removed. We trust that, if practicable, this reform will be carried out, and that we can say of fluid extracts—

"One hundred and forty-five extracts of but a single strength, One hundred and forty-five drugs whose dose is one."

Delicious! Isn't it? What a remarkable conception the writer must have had of the questions involved in the making of a good fluid extract! The Committee on Scientific Papers of the American Pharmaceutical Association ought to make it a point to get his views in detail for the next meeting.

ON the 29th of May the Senate of the United States adopted the following to regulate the sale of so-called "original packages":

"That all fermented, distilled, or other intoxicating liquors or liquids, transported into any State or Territory for use, consumption, sale, or storage, shall, on arrival in such State or Territory (or remaining therein), be subject to the operation and effect of the laws of such State or Territory, enacted in the exercise of the police powers, to the same extent, and in the same manner, as though such liquors or liquids had been produced in such State or Territory, and shall not be exempt therefrom by reason of being introduced there in original packages or otherwise."

We are not informed whether this is the final action, but it probably requires the vote of the lower House, as it differs from the original bill.

WE are accustomed to receive conundrums which "no fellow can find out," but the toughest one on record is the note just received from a special agent in this neighborhood who wishes that we will kindly favor him with a list of the mercantile houses, manufactories, or shops in New York having twenty or more employees. We confess our inability, and beg to refer the question to any one of our readers.

THE next one is not so bad, but we will let them go together:

"Any one interested in the sick-benefit, funeral-aid, and death-beneficiary associations of the United States can help make the statistics of their organizations for the forthcoming census more complete and disseminate the knowledge of the good work they are doing by sending the names of such societies as they may know of, and the addresses of their principal officers, to Mr. Charles A. Jenney, special agent of the eleventh census, 58 William street, New York City."

THE Senate Finance Committee, on the 39th of May, voted not to recommend free alcohol for use in the arts.

Dr. John B. Gray has been appointed to fill the professorship of Pharmacognosy in the Buffalo (N. Y.) College of Pharmacy.

Dr. Eli H. Long has been appointed Professor of Materia Medica in the department of pharmacy of the University of Buffalo, N. Y.

The Massachusetts Pharmaceutical Association will have its next annual meeting in Haverhill on the 18th, 19th, and 20th of June, instead of the 10th as announced. Mr. W. H. Underhill, of 191 Merrimack st., is the local secretary.

FROM the last report of the Assistance Publique it appears that the hospitals' estimated expenditures will be 37,192,085f. in 1890, against about 27,300,000f. in 1879, an increase attributed chiefly to a greater number of patients. The expenses for drugs will be considerably higher. There will be, however, one notable exception in the case of antipyrin, whose history is peculiar. Before 1884 the annual consumption was only 725 Gm. at 180f. a Kgm., but in that year it suddenly rose to 357 Kgm. at 180f., thus costing over 40,000f. Then the hospitals had to pay the syndicate's prices, the name "antipyrin" being copyrighted in France. But of late some chemists got around the monopoly by calling the article "analgesin," and have been manufacturing and selling it freely under the statutes which forbid the patenting of any medicine. In consequence the price fell to 85.50f., and finally to 79f. a Kgm., so that in 1889 the expenditures for antipyrin were 25,000f. against 40,000f. in the year preceding.—*Chem. and Drug.*

CORRESPONDENCE.

The Composition of Saccharin.

Editor of the American Druggist:

DEAR SIR:—Your July issue of 1889 contained a brief notice of my work upon orthosulphobenzoic acid and its derivatives,* with an abstract of the approximate analysis there given of the substance from which I obtained my acid, viz., saccharin. The September number brought a reply to this article by the New York agents of saccharin, Messrs. Lutz & Movius, probably written by one of their chemists. It seems rather late in the day for me to reply to this article, but inasmuch as I did not receive it until quite recently, I hope you will be indulgent with me and accept these lines. Having handled saccharin as it is sent into the market for a space of over one and a half years, I have acquired some knowledge as to how this product is constituted and just what it contains. In the first place, when the writer of the article in the September number calls the "true sweet principle" of saccharin orthosulphaminebenzoic acid, he errs, because this latter substance is absolutely devoid of taste, and does not assume a sweet taste until its anhydride—anhydro-orthosulphaminebenzoic acid, or, as its discoverer, Prof. Ira Remsen, named it, benzoic sulphinide—is formed. Secondly, that it lies in the power of the manufacturers of saccharin to regulate the composition of their product I do not for one moment question, but when the writer of the article remembers that my work was done in 1887-'88, when saccharin was a new product in commerce, he will perhaps admit that at that time regulation of its composition was not thought much of, if at all, by the manufacturers. As a matter of fact, the very first product which came into my hands contained about 33 per cent of benzoic sulphinide. The product, however, steadily improved, much to my delight, as time went on, until finally in 1888 I managed to get hold of a sample which yielded me 43 per cent of benzoic sulphinide. It was owing to this change in the composition that I gave the figures approximately from the beginning to the close of my dealings with saccharin, viz., 30-40 per cent of benzoic sulphinide. I would have it distinctly understood that my analyses were only made and described as approximate, and I lay no claim to exactness, as they were not made quantitatively, my only object being to get some notion of how much benzoic sulphinide I could obtain for my work. If the writer of that article desires to obtain absolutely correct figures he should turn to Remsen and Burton's† work on this subject, where the method and results obtained are quite fully given. As is there shown, the product turned out in 1888 contained 48 per cent of benzoic sulphinide, and I will gladly admit, on the face of this evidence, that my figures were somewhat too low even for an approximate estimate. However, if my mention of the commercial product and its composition has caused the manufacturers to improve their product and raise the percentage of benzoic sulphinide contained in it from 40 per cent to 60 per cent, it has fully served its purpose.

Yours very truly,

A. R. L. DOHME.

BERLIN, April 7th, 1890.
Laboratory of Prof. von Hofmann,
University of Berlin.

Scientific Papers for the A. P. A.

Editor American Druggist:

DEAR SIR:—As chairman of the section on Scientific Papers of the American Pharmaceutical Association, I submit the following list of titles for publication. We have the promise of papers on these subjects, and expect them to be presented at the thirty-eighth annual meeting to be held at Old Point Comfort, Va., commencing September 8th. I suggest that delegates come to the meeting prepared to discuss such subjects as specially interest them. It is desirable to have as many of the papers as possible in the hands of the committee by July 1st, so that they can be published in accordance with the resolution passed at the San Francisco meeting. Titles of the papers should be reported at once.

1. *Pseudotsuga Douglasii* Carr, as a substitute for *Quercus Suber*.
2. A Few Statistics.
3. Syrup of Hypophosphites, U. S. P.
4. Pacific Coast Specimens of *Rhamnus*.
5. The Florida Phosphate Deposits.
6. What is the active principle of *Arnica*?
7. Not infrequently physicians prescribe in one mixture Solution of Arsenite of Potassium and Tincture of Chloride of Iron. What, if any, action or reaction do these two compounds exert upon each other, and are they incompatible therapeutically or not?
8. Which of the modern antiseptic dressings can be prepared with advantage and profit to the retail pharmacist?

* "Orthosulphobenzoic Acid and some of its Derivatives." [Dissertation—Johns Hopkins University—for the degree of Doctor of Philosophy.] 8vo, Baltimore, 1889.

† "On the Action of Dilute Acids upon Benzoic Sulphinide, and the Analysis of Commercial Saccharin" (Amer. Chem. Jour., vol. II, p. 408).

9. A treatise on American Isinglass.
10. Pharmaceutical Notes.
11. An essay on the Medicinal Plants of Florida.
12. What is the comparative value of Yerba Santa, Licorice, and Saccharin in masking the taste of Quinine and other bitter substances?
13. Quinine, Opium, and Iron, pharmaceutically, scientifically, and therapeutically considered.

DR. H. M. WHELPLEY.

St. Louis, Mo., May 28th, 1890.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,446.—Sales of Carbonated Drinks on Sunday (X. Y. Z., Alabama).

"... Whether soda water is considered a drug or not, in a general sense. Our city authorities forbid the sale of everything on the Sabbath excepting drugs, and they claim that soda is not a drug, as used, but only a luxurious drink, and that it should not be sold on the Sabbath."

Soda water (so-called), as dispensed in drug stores, is not a drug or even a medicinal substance. It is not sold for any therapeutic purpose, nor is it often used with such purpose in view.

We quite approve of the enactment of municipal ordinances which encourage rest from labor and business on one day in every week, but their enforcement should be effected with reason. The true purpose of such laws should be to give man and beast an opportunity for change of surroundings, recreation, and a more prolonged interval of rest from bodily and mental toil than can be had during the remainder of the week. Entirely apart from any religious conviction, it is essential to the welfare of every community that this observance of the seventh day should be respected. It is to the credit of this country that such is the custom here, and while there may be doubt as to whether the rigorous enforcement of Connecticut "blue laws" in this matter are altogether wholesome, there can be no question that the general principle is something to be fought for, if need be. Given a people who utterly disregard this injunction of the twentieth chapter of Exodus, and you will also have one which is degraded, poor, and ignorant.

Observe, however, that the Biblical injunction is confined to labor. Whether it is desirable or not to regulate by municipal ordinance the forms of amusement and recreation in which the citizens may indulge on that day, must depend largely upon the character of the majority of them. It would be manifestly impolitic to allow men to spend in one day of drinking and debauchery the savings from labor on the other six, since it ruins the individual financially and morally, and, in most cases, imposes the care of himself and his family upon other members of the community. Therefore there is justice and equity in restricting the sale of strong liquors on the Sabbath day. There is, however, no reason for prohibiting the sale of commodities which furnish innocent pleasure, or in closing such places of recreation or amusement as are elevating in their tendencies. If there is any one day in the week when picture galleries, museums, public gardens, and out-of-town pleasure resorts should be open and free in preference to another, it should be on the day appointed for rest. Soda water should be sold on that day, not because it is a drug, but because it is a refreshing and harmless beverage, and because, it being in the nature of mankind to make eating and drinking a large part of his pleasure, something to drink he will have; and it is better for him and the community that he should fill himself to distention and satiety, if he will, with bottled wind than with bottled whiskey. Laws which prohibit the sale of harmless beverages on Sunday as well as other days are the result of bad judgment, but while they remain unrepealed they should be obeyed, and in most communities the more rigid the observance the sooner will be their repeal.

No. 2,447.—Analytical Balance (I. A. A.).

This correspondent asks: "How much quantitative analysis could be done with a \$11.00 balance said to turn with one-fiftieth of a grain, or 1 Mgm.? By using somewhat larger quantities, would not the results be nearly if not quite as accurate as with a larger and more expensive analytical balance? Would not a series of papers on drug and chemical assaying, with the apparatus readily procurable in an ordinary drug store, be both profitable and desirable?"

We have no doubt that, if the balance is kept in prime condition and if it is tested frequently as to its correctness, a great deal of analytical work may be done with such a balance, though, to avoid gross errors, rather large

quantities of material would generally have to be worked upon. Yet this is sometimes as much of a drawback or source of error as an untrustworthy balance. It will depend entirely on the kind of work that is to be performed. But there is a still more important matter which our correspondent may have overlooked. A balance may be cheap and yet true and trustworthy. This is easily tested. But how about the weights? Without accurate weights no reliable work can be done. And a cheap set of weights cannot be trusted for analytical work. We are inclined to think that the weights to be procured will cost perhaps as much if not more than the balance. But without them the latter cannot be used for analysis. We should be pleased to hear from our correspondent again, especially if he will send us the result of his analytical work.

No. 2,448.—Aniline Black Ink (G.).

R. Boettger, some seventeen years ago, gave a formula for preparing an indelible ink of aniline black. We have tried it several times, but have not had very much success with it, possibly because we may not have had the proper kind of aniline black. Aniline black, as a fast and permanent coloring agent, is not kept as a ready-made color, but is generated upon the fabrics themselves. Ready-formed aniline black is a very insoluble and intractable body.

Boettger's formula is as follows:

Triturate 60 grains of aniline black with a mixture of 1 fl. oz. of alcohol and 60 drops of concentrated hydrochloric acid. Then dilute the deep-blue liquid with a hot solution of 90 grains of gum arabic in 3½ fl. oz. of water.

This ink does not act upon steel pens, and is indestructible by strong acids or alkalies.

If the deep-blue liquid first produced is diluted (instead of with solution of acacia) with a solution of 75 to 90 grains of shellac in alcohol, a varnish is obtained which may be used to apply a jet-black coat to wood, metal, or rubber.

For typewriter ribbons we do not believe that the aniline black would answer, if a *real black* color is wanted. We believe that india ink in this case would come nearest to the mark.

No. 2,449.—"Cleansing Cream" (B. & Co.).

Our correspondent desires to obtain the formula of a paste for removing spots and stains from cloths, collars, etc.

The following will probably answer this purpose:

- | | |
|------------------------------|--------|
| 1. Extract of Quillaja | 1 oz. |
| Borax | 1 oz. |
| Oxgall, fresh | 4 oz. |
| Tallow Soap | 15 oz. |

Triturate the borax with the extract of quillaja, and afterwards with the oxgall, which will cause at least partial solution. Then thoroughly incorporate with it the soap so as to produce a plastic mass, which may be moulded in sticks or put into boxes.

If no extract of quillaja is at hand, soap-bark in shreds may be exhausted with boiling water, and the liquid evaporated on a water-bath. One hundred parts of bark yield about 20 parts of extract.

- | | |
|---------------------|----------|
| 2. Oleic Acid | 1 part. |
| Borax | 2 parts. |
| Oxgall, fresh | 5 " |
| Tallow Soap | 20 " |

Triturate the borax with the oxgall; then thoroughly incorporate with it the soap, previously reduced to powder, and lastly incorporate the oleic acid.

No. 2,450.—Extractum Pini Sylvestris (F. A. R.).

In reply to an inquiry whether this preparation is "used by the U. S. Pharmacopoeia, and to what extent," we would inform our correspondent that it is not correct to speak of an article as being "used by the Pharmacopoeia," the latter being a book or code, enumerating those articles which are officially recognized. Our answer then is, that the U. S. Pharmacopoeia does not officially recognize the extract of pine needles or extract of fir wool. The British Pharm. recognizes the oil distilled from the fresh leaves of *Pinus sylvestris*.

No. 2,451.—Phenacetin (L. S. L.).

Phenacetin being so very little soluble in water, its administration has given considerable trouble. Our correspondent has had occasion to dispense it in capsules and in pills, and in this form it appears not to have given satisfaction. As the dose is comparatively small, we recommend to administer it in form of powder, best so that it be triturated with at least an equal weight of sugar of milk. The more diluted it is the more rapidly will it be absorbed. If it is introduced into the stomach in a compact mass, the exterior layers of this are liable to remain entirely unacted upon by the gastric liquid, and the remedy remain without effect.

No. 2,452.—Macassar Oil (W. P. O.).

We do not know that the exact composition of the particular brand mentioned by our correspondent has ever been made known. The published formulæ vary greatly and do not yield a product resembling this brand. Yet, as we have had an inquiry about such formulæ from another correspondent, we will quote two of them here. One is as follows:

Sunflower oil 100 parts, goose fat, horse-neck fat, each 15, storax 8, oil of eggs 8, oil of thyme 8, butter cacao 8, oil of neroli 4 parts, balsam Peru one-half part, oil of rose one-twentieth part.

Another is given thus:

Almond oil 2,000 parts, oil of cloves, mace, rose, and tincture of musk, each 5 parts, oil of cinnamon 15. The almond oil is to be first tinted by digesting it with 200 parts of alkanet root.

The two products are entirely different, but are sold under the name macassar oil in some parts of the Continent of Europe.

No. 2,453.—Explosion of Oil of Savin (R. B. P. & Co.).

These subscribers write to us as follows:

"A 4-oz. bottle of oil of savin, just as it came from the jobber, never having been unstopped, and standing quietly in our prescription case in a room with a temperature not over 70° F., exploded with great violence. Why did it do so?"

This is a puzzle to us. We can only account for it by supposing that the contents were under more than usual pressure from expansion through heat, the particular source of heat having perhaps been overlooked by our correspondents. Or something else close to the bottle may have exploded and involved the bottle in the catastrophe. Had the oil come in contact with iodine it would of course have "gone off" with considerable violence. But this appears to be excluded from the category of possibilities. Certainly there is nothing in oil of savin which would cause it to explode any more than oil of turpentine would.

No. 2,454.—Prescription Difficulty (A. D.).

This subscriber asks what the color of the following mixture should be:

- | | |
|---------------------------|--------|
| Tinct. Nucis Vomicae, | |
| " Cantharidis, | |
| " Ferri Chloridi, | |
| Acidi Phosphor. Dil. | aa 23. |

He states that he made it several times, and that, after standing five to ten minutes, the mixture always turned milky.

We have tried the mixture ourselves, but beyond a very slight cloudiness, due to the slight precipitation of resinous and oily principles from the tinctures of nux vomica and cantharides, we have not observed any sign of "miliness." Our tinctures, etc., were made exactly after the U. S. Pharm. Is our correspondent sure that this was the case with his?

No. 2,455.—Resinoids (Sch. & F.).

The manufacture of the so-called resinoids, as now carried on, is not described in any work of reference known to us. Increased knowledge of the proximate principles of plants, and a gradual change in the mode of prescribing such preparations, have brought about certain changes in manufacture, which are known only in the case of a comparatively small number of them, chiefly such as are used by all schools of medicine. The old method used to be to precipitate an alcoholic tincture of the drug, with or without alum, etc. Regarding this method the standard work to consult is the American Dispensatory (by King; Supplement by King and Lloyd; Cincinnati).

No. 2,456.—Non-official Chemicals (A. M.).

The Dispensatories give a very full and detailed account of most medicinal chemicals, both "official" and "non-official." Our correspondent appears to have been unsuccessful in finding several iron preparations in the Pharmacopoeia, although they are contained therein. The trouble is this, that he is not familiar with chemical nomenclature, else he would have known that protosulphate of iron is the old name (according to the old chemical nomenclature) for ferrous sulphate (official as "Ferri Sulphas").

No. 2,457.—Works on Perfumery (C. F. D.).

The works which in our judgment are the most practical are the following: Piesse, "The Art of Perfumery" (London). Hirzel, "Toiletten-Chemie" (Leipzig). Cristiant, "Perfumery and Kindred Arts" (Philadelphia). Mierzinski, "Die Riechstoffe" (Weimar). Askinson, "Die Parfumerie Fabrikation" (Wien).

Sodium Carbonate an Unsafe Basis for Volumetric Work.—Many authorities advise the use of anhydrous sodium carbonate as a basis or starting point for the preparation of volumetric solutions, assuming that, if prepared from pure bicarbonate of sodium, it will be an absolutely pure and homogeneous salt when the excess of carbonic acid has been expelled. Dr. R. Kiesel has, however, recently found that some "chemically purest" dried sodium carbonate (specially offered for analytical purposes), and which should have had a composition corresponding to the formula $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$, lost, on being heated to 150° C., 15.39 per cent, while it should have lost only 14.51 per cent of water. On further examination the salt was found to contain still 0.63 per cent of carbonic acid, owing to the original bicarbonate not having been completely reduced.—After *Zeitsch. f. angew. Chem.*

American Druggist

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Whole No. 193.

[ORIGINAL COMMUNICATION.]

A DEVICE TO SEPARATE ETHEREAL FROM AQUEOUS LIQUIDS.*

BY WILLIAM P. DE FOREST, BROOKLYN, N. Y.

ANY bottle, large enough to hold a little more than all the liquid, may be fitted with a rubber cork, through which pass two glass tubes, one long enough to go to the bottom of the bottle, the other just passing through the cork, each projecting outside about an inch, with a piece of rubber tubing attached. Pour the liquid into the bottle, put a pinchcock on each rubber tube, place the cork in the neck of the bottle, and turn the bottle upside down. Let it rest a few minutes, long enough for the ether to rise on top, then take off the compress from the long tube so that air may pass into the bottle above the liquid; then by opening the pinchcock on the smaller tube the liquid may be drawn off. The line of demarcation will be seen very clearly in the small glass tube as soon as the ether is drawn down to it, and by care not a drop need be lost.

[ORIGINAL COMMUNICATION.]

ON THE MENSTRA FOR FLUID EXTRACTS AND TINCTURES, AND ALLIED SUBJECTS.

BY WILLIAM WEBER, PITTSBURGH, PA.

(Continued from page 104.)

Extractum Gelsemii Fluidum; Tinctura Gelsemii.—Menstruum, alcohol for both. Active principle, gelsemine, about 0.49 per cent, 1 part soluble in 650 parts of water; therefore the menstruum is proper for fluid extract.

Extractum Gentianæ Fluidum.—Menstruum, diluted alcohol. Gentiopicroin one-tenth per cent, the active agent, easily soluble in water and alcohol; therefore a weaker menstruum might be just as good, as recommended in the "Digest."

Extractum Geranii Fluidum.—Menstruum, diluted alcohol; tannin, 13 to 17 per cent (Maisch), appears to be sought here.

Extractum Gossypii Radicis Fluidum.—Menstruum, alcohol; action probably due to a resin.

Extractum Grindeliæ Fluidum.—Menstruum, 3 alcohol, 2 water; should be alcohol. Also, the National Dispensatory says: "Alcohol has yielded an unobjectionable fluid extract." Constituents, a little volatile oil, resin, possibly a glucoside and alkaloid (Maisch).

Extractum Guaraniæ Fluidum.—Menstruum, 3 alcohol, 1 water. Contains caffeine, 3 to 5 per cent, soluble in 75 parts water, 35 parts alcohol, United States Pharmacopœia. In the "Digest," alcohol, or 2 alcohol and 1 water, or 50 alcohol, 4 glycerin, and 4 water, is recommended. If the drug should contain as high as 5 per cent of caffeine, the quantity would be too large even for pure alcohol to dissolve out, unless some other substance renders it more soluble in alcohol; but I found that 1 part of caffeine dissolves only partially in 35 parts of alcohol, as stated above. This result accounts, perhaps, for the statement to be found in the National Dispensatory: "The commercial fluid extract was found by Hosack (1883) to contain between 1.10 and 1.68 per cent of caffeine, or one-third to one-quarter present in guarana." Indeed, the menstruum, 2 alcohol, 1 water, proposed by A. Robbins, seems to be the proper one.

Extractum Hamamelidis Fluidum.—Menstruum, 1 alcohol, 2 water. Constituents not fully known as yet; but as hamamelis contains a volatile oil and bitter principle, a stronger alcoholic menstruum is perhaps indicated.

Extractum Hydrastis Fluidum (menstruum, 3 alcohol, 1 water); *Tinctura Hydrastis* (diluted alcohol).—Active constituents, berberine and hydrastine, both of which are only sparingly soluble in water; therefore alcohol would seem indicated.

Extractum Hyoscyami Fluidum (menstruum, 2 alcohol, 1 water + diluted alcohol); *Tinctura Hyoscyami* (diluted alcohol).—Active constituents, hyoscyamine, hyoscyne, together, alkaloids about 0.3 per cent (Maisch), 0.4 per cent (Möller); 0.2 hyoscyamine soluble in 100 water, also hyoscyne sparingly soluble in water; perhaps a stronger alcoholic menstruum useful, but these two alkaloids easily dissolve in diluted alcohol, as found for atropine.

Extractum Ipecacuanhæ Fluidum.—Menstruum, mostly alcohol; object, emetine 1 per cent (Möller), 1 to 2 per cent (Maisch).

Extractum Iridis Fluidum.—Menstruum, 3 alcohol, 1 water. No perfect analysis; probably a resin the active component, and therefore alcohol indicated.

Extractum Kramerie Fluidum (menstruum, 20 glycerin, 80 diluted alcohol); *Tinctura Kramerie* (diluted alcohol).—Object, kramero-tannic acid, 20 per cent (Maisch).

Extractum Leptandree Fluidum.—Menstruum, 15 glycerin, 85 diluted alcohol. Stronger menstrua proposed. Active principle not known. Leptandrin soluble in water, resin 6 per cent, etc. (Maisch).

Extractum Lobeliæ Fluidum; Tinctura Lobeliæ.—Menstruum, diluted alcohol for both. No change proposed; lobeline easily soluble in water and alcohol.

Extractum Matico Fluidum (menstruum, 10 glycerin, 75 alcohol, 25 water + 3 alcohol, 1 water); *Tinctura Matico* (diluted alcohol).—Probably alcohol best, as activity likely depends on the volatile oil, 2.7 per cent (Möller).

Extractum Nucis Vomice Fluidum; Tinctura Nucis Vomice.—Menstruum, 8 alcohol, 1 water. Lyons ("Digest") points out that the fluid extract often contains less than 50 per cent of the total alkaloids, and that it seems practically impossible to exhaust nux vomica completely by any known processes for fluid extracts. Perhaps it would be well to add some sulphuric or hydrochloric acid to the menstruum before final operation.

Extractum Pareire Fluidum.—Menstruum, 20 glycerin + diluted alcohol. Active principle, pelosine, insoluble in water and identical with buxine and berberine; therefore alcohol would seem more appropriate.

Extractum Pilocarpi Fluidum.—Menstruum, diluted alcohol. Active constituents, pilocarpine one-quarter to one-half per cent (Maisch), and probably also jaborine. As the latter is less soluble in water than pilocarpine, alcohol would be preferable.

Extractum Podophylli Fluidum.—Menstruum, 3 alcohol, 1 water. Podophyllotoxin is the active principle, and being only sparingly soluble in water, alcohol is probably better.

Extractum Quassie Fluidum; Tinctura Quassie.—Diluted alcohol for both. Active principle, quassia 0.6 per cent (Husemann and Hilger), easily soluble in water and alcohol; therefore a still weaker menstruum proposed.

Extractum Rhei Fluidum (menstruum, 3 alcohol, 1 water); *Tinctura Rhei* (diluted alcohol).—The constitution of rheum is very complex, and but little of it is definitely known; the menstruum, therefore, is difficult to determine, unless by the physiological action of preparations made with different menstrua.

Extractum Rhois Glabræ Fluidum.—Menstruum, 10 glycerin + diluted alcohol. New menstruum proposed in "Digest." Active principle, tannic acid.

Extractum Rosæ Fluidum.—Menstruum, 10 glycerin + diluted alcohol. Contains trace of volatile oil; perhaps alcohol indicated for a more aromatic fluid extract.

Extractum Rubi Fluidum.—Active principle, tannic acid, 10 to 12 per cent (Maisch). New menstruum proposed in "Digest."

Extractum Rumicis Fluidum.—Menstruum, diluted alcohol. If its action is due to chrysophanic acid, which is nearly insoluble in water, a stronger alcoholic menstruum is indicated. So also "Digest."

Extractum Sabinæ Fluidum.—Menstruum, alcohol, as it contains a volatile oil, about 2 per cent (Maisch), 3.75 per cent (Möller).

Extractum Sanguinariæ Fluidum (menstruum, alcohol); *Tinctura Sanguinariæ* (2 alcohol, 1 water).—Active principle, sanguinarine. Alcohol should also be adopted for the tincture.

Volumetric Estimation of Tannin.

E. GUENEZ, in a communication to the Académie des Sciences, proposes a novel method for estimating tannin (*Compt. Rend.*, 110, 532). The following abstract is taken from the *Chem. News* (April 25th):

The process of Löwenthal, modified by Neubauer, the most important of the volumetric methods, is applicable only in certain cases. It is founded upon the oxidation of tannin by permanganate, and it can be accurate only if applied to a solution of pure tannin. The presence of organic matters which accompany tannin in industrial extracts becomes a grave source of error.

* Read before the Kings County Pharmaceutical Society, April 8th, 1890.

The author founds a rapid process for the determination of tannin upon the following reactions:

1. If into a boiling solution of potassium-antimony tartrate, mixed with a suitable aniline color, there is poured a solution of tannin, there is formed a precipitate of antimony tartrate which carries down the coloring matter, forming a true lake. If the proportion of tannin is sufficient the supernatant liquid becomes colorless. The antimony salt must be in excess in reference to the coloring matter.

2. The volume of the colored solution of the antimony salt and the volume of the solution of tannin which must be added are always proportional. Dilution does not affect the results.

3. A given quantity of antimony tannate always fixes the same quantity of coloring matter.

4. If a solution of gallic acid is poured into a boiling solution of the antimony salt, no immediate precipitate of antimony gallate is formed. Under the same conditions the antimony tannate is produced immediately. Hence it is permissible to suppose that the presence of gallic acid does not interfere.

The method of operating is as follows:

A solution is prepared of

Tartar Emetic.....	12 Gm.
Poirier's Green, 4 J. E.	1 Gm.
Distilled Water.....	1 liter.

The antimony salt and the coloring matter are dissolved separately; the two solutions are then mixed and filtered. The aniline greens are the only colors suitable, and Poirier's green, 4 J. E., has given excellent results. This solution is standardized by means of a solution of tannin in ether, perfectly pure and dried previously in a vacuum over sulphuric acid. A solution is made up containing 5 to 6 Gm. per liter, and there is added a small quantity of thymol dissolved in alcohol to prevent mouldiness.

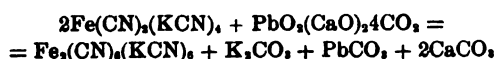
A burette, fitted with a glass cock, is filled with a solution of tannin, and on the other hand 20 C.c. of the colored solution of antimony salt and an equal volume of distilled water are put in a glass tube 35 Cm. in diameter. The colored solution is raised to a boil, and the tannin liquid is run in, at first by cubic centimetres and afterwards by drops, until the complete discoloration of the liquid, which must be boiled anew after each addition of tannin. There is formed a green flocculent precipitate, which readily collects together and enables the decoloration of the liquid to be observed. When complete the volume of the tannin consumed is read off on the burette, and the standard of the antimony solution is thus known.

This method is readily applicable to the analysis of industrial extracts; but as the tannins of these extracts are not identical with the tannin of gall nuts which has been selected as a standard, the richness of an extract will be represented in the analysis by an equivalent weight of nut-gall tannin.

This is the case with all volumetric processes when it is not possible to titrate the liquid with the same kind of tannin which has to be determined. The process of Muntz may be utilized to find the agreement between the gravimetric and the volumetric determination. The process is not vitiated by the presence of gallic acid, but it is not applicable to the determination of tannin in wines.

A New Process for Manufacturing Ferricyanide of Potassium.

Of the several methods that are available for converting ferrocyanide into ferricyanide on the large scale, that involving the use of chlorine is usually employed on account of its cheapness, but there are objections to its use. Especial precautions have to be taken to avoid the introduction of any excess of chlorine over that required to complete the reaction, otherwise the ferricyanide produced will suffer decrease both in quantity and quality. Another drawback to the use of chlorine is the occurrence of spontaneous explosions in the vessels containing the materials during the oxidation, due, as is commonly explained, to the formation of chloride of nitrogen. These inconveniences could be avoided by the use of peroxide of lead, but the cheapest means of producing that substance has been still too expensive hitherto for competing with chlorine as the oxidizing agent. But a recent invention of G. Kassner (*Chem. Zeit.*, 13, 1701) has made the use of lead peroxide practicable in the form of calcium plumbate, which is easily obtained by roasting oxide or carbonate of lead with calcium carbonate at a low red heat. In the conversion of ferrocyanide into ferricyanide by means of lead peroxide, a quantity of potassium hydrate is set free, which must be neutralized in some way before the reaction can go on to completion, and carbonic acid suffices for the neutralization. Kassner's process consists in adding calcium plumbate to a solution of potassium ferrocyanide and passing a stream of carbonic acid gas, when the reaction proceeds according to the equation:



The carbonates of lead and calcium separate as an insoluble precipitate, which can be filtered off and regenerated by a simple roasting, whilst the solution contains potassium ferricyanide in a pure form and potassium carbonate as a valuable by-product. Kassner considers that the intrinsic merits of potassium ferricyanide as an oxidizing agent in alkaline solution will occasion an extensive demand for it when its production has become sufficiently cheap.—*Journ. Soc. Chem. Ind.*

Thioketone, the Worst-Smelling Substance Known.

An amusing instance of the inconveniences of carrying on chemical research in populated districts (*Brit. and Col. Drugg.*) appears accidentally in a paper on "Thio-derivatives of Ketone," by E. Baumann and Fromm. By the reaction of sulphuretted hydrogen on acetone in the presence of condensation agents, they obtained principally trithioacetone, $\text{C}_2\text{H}_3\text{S}_3$, and small quantities of a non-volatile, definitely crystalline compound, $\text{C}_4\text{H}_5\text{S}_4$, tetrathio-pentone. At the same time, however, an exceedingly volatile body was formed, which possessed a smell so horrible that, in comparison therewith, ethylmercaptan, ethylmercaptan, and other volatile sulphides must be considered as faint-smelling substances! The authors could not obtain the compound pure (for a reason which they mention further on), but there could be no doubt that it was the monosulphuretted acetone, $\text{C}_2\text{H}_3\text{S}$, or thioketone. As they were once distilling the reaction product of 100 Gm. acetone, concentrated hydrochloric acid, and sulphuretted hydrogen, with the most perfect arrangement for condensation, so that no perceptible loss of the product occurred, the atmosphere of the surrounding district of the town was infected over an area more than 800 yards wide! Every attempt to obtain the substance pure brought down such a storm of protest and complaint against the laboratory that the authors were compelled to relinquish the research.

Note on Wool Fat.

At a recent meeting of the Society of Chemical Industry, Mr. H. W. Langbeck read a paper on "Wool Fat and Processes for Obtaining It," in the course of which he gave his experience acquired in its manufacture, and added some further interesting information, which we reprint here (after the Society's *Journal*):

A patent was taken out by myself and my assistant, Mr. Ritsert, on May 7th, 1886, by which we treat the raw wool fat with boiling alcohol containing about 10 per cent of ether, by which means we dissolve the free fatty acids, the free cholesterin and isocholesterin, and the volatile ethers of the free fatty acids present in the raw wool fat. The remaining cholesterin ethers are then treated with steam in order to drive off remnants of the solvent. Or we dissolve the raw wool fat in ether and separate the cholesterin ethers by the addition of alcohol. Thus purified, they are mixed with about 20 per cent of water, and called by us cholesterinol.

Instead of working on raw wool fat we may use the lyes of wool-washing works.

Wool fat thus purified leaves much to be desired, as the presence of cholesterin ethers of higher melting point, wax-like, render it tough and make it unfit for pharmaceutical or cosmetic purposes.

I obtained a second patent in September of the same year, by which I use either the lyes of the wool-washing works or raw wool fat, commercially known as recovered fat. In working with the latter, I first separate the free fatty acids by means of solvents, such as alcohol mixed either with ether, chloroform, carbon bisulphide, acetone, benzolin, or naphtha, or by distilling the fatty acids off, preferably by superheated steam, at a temperature of 400°-450° F.

The fatty residue, after separation of the acids, is then filtered through animal charcoal, especially that known as prussiate waste, and this may be done in either of two ways: either by maintaining the fatty matter in a fluid condition by heat applied to it and to the filter, or by first dissolving the fatty matter, preferably in benzolin, carbon bisulphide, or acetone, and filtering the solution. The solvent is then recovered by distillation, and steam or warm air is blown through the fatty matter until all traces of the solvent have disappeared, when such has been used. The so purified wool fat is anhydrous, of a yellow color, and free from smell; if required as basis for ointments, pomatums, etc., 20 to 30 per cent of either water or a solution of peroxide of hydrogen is incorporated with it, thus producing a pure white material.

Dr. A. von Rad, of Bavaria, applied for a German patent in March, 1887. In his process he precipitates the lyes of wool-washing works with slaked lime, and deodorizes the precipitate by means of chlorinated lime and manganate or permanganate of potash or soda. The precipitate is then dried and the wool fat dissolved out successively by alcohol, benzin, carbon bisulphide, benzol, and a mixture of ether and chloroform; and in order to give this fat a proper consistence, he mixes it with neutral ethyl or methyl ethers of oleic acid and calls it "Lane-sine."

Later on Dr. von Rad obtained a second patent for a process by which he heats raw wool fat with alcohol and sulphuric acid, thereby changing the free fatty acids into the corresponding ethers.

Messrs. Singer and Judell extract the fat from wool by means of carbon bisulphide—a method tried years ago, but abandoned owing to the difficulty of rendering the wool odorless, or, when driving off the solvent by heat, to spoiling the wool. Messrs. Singer and Judell seem to have avoided this difficulty by using a very elaborate apparatus.

In order to prepare wool for the spindles, the dirt, fat, salts, soap, etc., naturally contained in the wool must be separated from it. This is generally done by washing and scouring the wool with soap lyes, which are then called liquor, and are of a dirty grayish, milky appearance, of the smell of ordinary soapsuds when fresh, of a putrid, ammoniacal smell after standing some time, and consist chiefly of potash salts, naturally found in the fleece of sheep, of wool fat, dirt, and soap.

Formerly this liquor was wasted; in later years it was saturated by means of acid, especially sulphuric acid, thereby recovering part of the fat. By this treatment the soap that has been used in scouring is decomposed, and its fatty acids, together with the wool fat and dirt, form a so-called magma, from which, after dehydrating, the fats are obtained by hot pressure; these are then remelted, allowed to settle, and filled into casks. Till about two years ago the value of such recovered fat was £7 per ton; now £11, £12, and even £13 are obtained, because large quantities are used in the United States for softening leather. I am told that in the course of twelve to eighteen months the thus greased leather deteriorates on account of the large amount of the free fatty acids present in the fat. Coarse wool contains about 7 to 10 per cent of fat, whilst fine wool, such as is imported from the Cape, Australia, and New Zealand, contains 30 to 40, and even 50 per cent; but the liquor yields by the acid treatment only about half the quantity it contains.

By my present invention I recover all the fat as well as the potash salts, dirt, and soap used in washing wool.

The wool is twice soaked in warm water of a temperature not exceeding 110° F., and pressed or dried by centrifugal action. The water thus obtained contains the potash salts naturally present in wool, together with a small quantity of potash soap formed by the action of potash on the cholesterin ethers and volatile acids, and also part of the dirt adhering to the wool; it is allowed to settle, and then concentrated in a suitable vacuum apparatus, preferably a quadruple Yaryan, then finally evaporated and dried, thereby obtaining the potash salts in an alkaline but impure condition; or the water is saturated with hydrochloric, sulphuric, or phosphoric acid, in order to more speedily form a sediment, and concentrated as before, thereby obtaining the potash salts as chlorides, sulphates, or phosphates. The sediment is either dried by heat, filter press, or centrifugal apparatus, or the potash salts are dried together with the dirt and used as manure. If it be desired to obtain the potash salts in a purer state, they have to be calcined, lixiviated, and recrystallized.

After concentrating the water and acidifying it, the emulsion is broken up and the small quantities of fat, together with the dirt, are removed and worked up together with the concentrated liquor of the subsequent washing with soap lye.

After the first treatment with water, the wool is washed and scoured with soap lye, consisting generally of an emulsion of olive oil and potash lye diluted with water, by which means all the fat, together with the remaining dirt, is removed, and forms with the lye an emulsion; the wool is then rinsed in water, pressed, and dried. The emulsion, together with the rinsings, are as far as possible concentrated on a Yaryan apparatus, and treated repeatedly with a mixture of alcohol and water, for economy's sake methylated or otherwise denaturalized spirit. I take, for instance, equal parts of spirit and water, but it may be varied to 3 parts of spirit and 2 parts of water, or 2 parts of spirit and 3 parts of water.

By this treatment the emulsion is broken up and the soap dissolved in the diluted spirit, leaving behind the wool fat and dirt; the soap and spirit are separated and recovered by distillation.

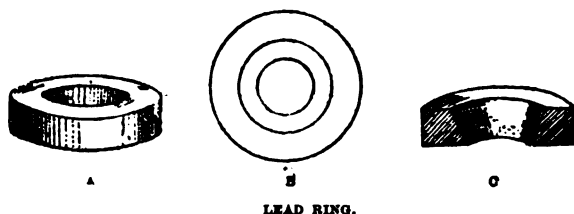
The wool fat is then extracted from the dirt either by hot pressure or by means of solvents, such as carbon bisulphide or benzin, for instance, and the solvent recovered by distillation. The wool fat is then practically free from soap and dirt, and, being also free from fatty acids, forms a valuable lubricant or leather grease, or it can be further purified by my patented process described before. The recovered soap is by itself unsuitable for washing purposes, because it contains a large amount of a soap which does not give a good lather with water, besides also a small quantity of cholesterin ethers of a higher melting point, probably stearate of cholesterin, which can be separated by treatment with strong spirit.

It is advisable to filter the soap solution, when cold, through flannel bags. The filtered liquid consists chiefly of oleine soap, and is recovered by distilling off the solvent, whilst the remnant on the filters can be made use

of, after decomposition with acids, for the manufacture of candles, for instance. This remnant soap is very sparingly soluble in water, but dissolves easily in hot spirit, from which solvent it separates whilst cooling, similar to stearine soap.

MENTHOL CONES.

THERE is little art in making these, but still a few wrinkles gathered from practical experience in manufacturing them on the large scale will not be out of place here. I may as well, however, preface my remarks with the hint that competition in the menthol-cone business is so keen that it is questionable whether it does not pay better to buy the cones than to make them. That is a point which retailers must settle for themselves. If they are to do the business properly they should have a variety of moulds, and these cost money. The question is, Will that cost be covered by the profit on the cones? Some druggists' sundriesmen supply the moulds. Like suppository moulds, they must be perfectly smooth inside, and the two parts should join exactly. An ordinary 2-drachm pessary mould is sometimes used for the cones, and in the absence of anything else is quite suitable. Menthol to be used for making cones must be quite free from oil; if not, it has too low a melting point and is unsuitable for the purpose. The menthol should be melted on a water-bath somewhat different from what is generally used for making ointments, as the usual surface exposed would favor too great vaporization of the stearoptene. It is better to place the menthol in a 1-ounce quinine bottle, and then place the bottle in hot water. Its contents soon melt, and are ready for pouring into the mould. Meanwhile the latter should have been placed near the fire, so as to acquire such a degree of warmth that it may be held comfortably in the hand. It is very important that this heating should be carefully attended to, as the temperature of the mould has much to do with the success of the operation. As soon as the cones solidify they are removed from the moulds, so as to prevent the latter from becoming cold again. Once the mould gets below the proper temperature the cones are certain to break. The next thing to do is to fix them into the holders. This is a matter which requires some care and attention. Instead of melting the base of the cone in a spirit flame, as is generally done, a better plan is as follows: Get a lead ring made, of the dimensions shown in the following figures,



A. View from the top. B. Section. The outer and second circle show the top, and the outer and third circle the bottom. C. Cross section.

and place it (the smaller end downward) in a flat evaporating dish (the lid of a 2-ounce ointment pot will do), along with some menthol. When the latter has melted dip a cone first in the ring, then in the hot menthol, and immediately fix in the holder. There are other minor difficulties to be met with in the course of manufacture which can only be overcome by the indispensable "mechanical ingenuity."—*Chemist and Druggist*, May 24th, 1890.

Iodized Cotton.

ETHEREAL and alcoholic iodine solutions, when brought into contact with the skin, irritate and even cauterize, whilst the absorption of iodine is limited. Good results are obtained by using iodized cotton, from which the iodine is liberated by very gentle heat. It is prepared as follows: Carefully cleaned cotton [purified, absorbent cotton—Ed. AM. DRUGG.] is put for a few minutes into a 2-per-cent solution of sodium carbonate, washed, and then kept for half an hour in 4-per-cent bleaching powder solution. It is washed until free from alkali, and kept for a quarter of an hour in water acidified with 5-per-cent hydrochloric acid; it is again washed and dried. Finely powdered iodine (8 parts) is strewn over the sheets of cotton (100 parts), which are then lightly rolled together and heated in a glass bottle until iodine vapor is given off. The bottle is then stoppered and heated for two hours in a water-bath. The iodized cotton is kept in well-closed glass vessels.—BRÉAUDET and CATHÉLINEAU in *Rép. de Pharm. and J. S. Chem. Ind.*

Trade Marks have been taken out in Germany by the Farbwerke of Meister, Lucius & Brünig in Höchst o/M., for two new preparations supposed to be intended for use in medicine. They are called "Phthiosot" and "Benzosol."

Metric Weights and Measures in the United States.*

MR. PRESIDENT AND GENTLEMEN:—It gives me very great pleasure this morning to be afforded the opportunity to speak to you on the subject of weights and measures. I might explain in the beginning that, although I have very long been personally interested in the subject of weights and measures, it happens just now that I am officially interested in the subject. And this, perhaps, is the excuse which the Committee has for inviting me to address the Convention this morning.

I am sure this Convention does not need any instruction from me with regard to the existing system or customary system of weights and measures. It is very probable that you are as well posted on the subject as anybody with regard to this system. It abounds in absurdities and in complexities and a great many other things that I will not stop to mention, that are altogether disreputable.

That is, I mean to say the customary system of weights and measures in use is founded on no scientific basis, and is, therefore, as indefinite and as illogical as it can well be. It is probably known to all of us that this customary system has come to us as the "English" system of weights and measures, and that it is essentially different from what the English system is at the present time. That is to say, that, within the last fifty years, the English have improved their system of weights and measures, while we have not improved ours, nor changed to the extent that they have, by any means, and yet they have thrown off some of the absurdities existing in the earlier part of the century, and which still cling, I am sorry to say, to our own system. Now, everybody, I think, who has been interested in the system of weights and measures in this country, has been looking for many years to the final adoption of a more rational system—that is to say, the metric system; not the French system especially, but the metric system founded upon the meter as a basis.

Now, I want to say a few words about modern progress in this line in the direction of the metric system.

You all know the United States was one of the first nations to receive copies of the meter. As a matter of fact, during the French Revolution the Committee on Safety, of which the celebrated Robespierre was chairman, transmitted to the United States a copper meter and a copper kilogramme by order of the Committee, and this meter and kilogramme were placed among the archives. We have in the archives of the United States Coast Survey Office what is known as the Committee meter—an iron bar of great historic interest, as only three or four are now in existence. This is one of the fifteen iron bars which were prepared from a study of the meter, and was obtained very long ago. We began early in the United States to interest ourselves in this subject. Perhaps some of you know that this matter was a subject of interest to Washington and Adams and others. Indeed, they were all interested in this great and important subject of metrology.

The Congress of the United States gives power to establish weights and coinage, but Congress has never established a system of weights and measures. It has established a system of coinage. That was done very early, at an early period of our national existence. The first step that looked to the actual introduction of the metric system in this country came many years after this early period I have spoken of; that is to say, it came in the year 1868, when a law was passed by the Congress of the United States legalizing the use of the metric system in this country, and establishing certain approximate relations between the metric and the customary systems. This was a most important act, although perhaps there was little change, immediately after the passage of this act, in the condition of things compared with what existed before, and yet the passage of this act was an epoch in the history of metrology in this country.

I want to emphasize one fact which is not generally recognized in relation to this subject, and that is, that *to-day the meter and the kilogramme are the only units that have been established by Congress for this whole country.* It has often been thought and assumed that the yard is a legal unit of length, and that the pound is a legal unit of weight, and that both were established by act of Congress, but this is not the case. The troy pound in the Philadelphia Mint was established by act of Congress and was established as the legal unit at the Mint for the coinage, and for that only, and, therefore, has no authority for any other purpose. The avoirdupois pound never was the legal unit, and the yard has never been established by act of Congress of the United States as a legal unit. The authority which the yard has in this country depends entirely upon the yard which was adopted by the first Superintendent of the Coast Survey, Mr. Husler, as the unit of length in the survey of the coast, and by the Secretary of the Treasury, at the same time, for use in the customary uses; that is to say, it is a departmental adoption. The Second Auditor of the Treasury has adopted the yard as the unit of length. About the year 1835 Congress passed a law authorizing the Superintendent of Weights and Measures to certify the exact gallon to the

office of the Treasury Department as a standard, to be presented to the States of the Union, and that was done. The result of this was that in all the States in the Union practical laws were at once passed adopting these models of the Treasury Department as standards of length. As a matter of fact, therefore, our legislation to-day, so far as it exists in the United States, is comprised in *State* and not in national legislation.

As a matter of interest, it may be stated that some of the States have failed to adopt this law with regard to the United States standard; and in some States there actually exist laws punishing the use of false weights, and yet there is no law establishing what the true weight is. There is, however, a resolution concerning this matter before Congress at the present time. Whatever legislation has been enacted has *not* been national; it was really State legislation. In 1860 Congress passed a general act legalizing the meter and kilogramme all over the country; therefore *the meter and the kilogramme are the only United States standards which we have to-day*—that is, which have really been adopted.

Now, without alluding to the various measures that we have taken between 1866 and the present time to disseminate the knowledge of the metric system, I want to make a few remarks on the growth of the International Bureau of Weights and Measures. I would say that in 1869 the French government invited other governments to send delegates to Paris in order to attend the International Bureau of Weights and Measures, that they might agree on the construction of a new international meter. The old meter of the archives was still preserved, but it was relegated to a back seat, and no longer had the great authority it formerly had, since its form was not recognized as coming up to the modern ideas of metrology. The French government, therefore, concluded that it was time to construct a new meter which should be first in authority the world over.

The outcome of this was that the United States sent delegates, and in 1875 there was organized the International Bureau of Weights and Measures. This was by an International Convention. It was held in France, and about twenty-five nations were represented and joined together at that time, and what they did has been authority up to the present time, or until six months ago. The International Bureau of Weights and Measures has been supported by the payment of various sums of money by various nations. The United States has contributed to this bureau forty or fifty thousand dollars. The trouble was to get material out of which to make the standards, but finally the material was found and used, and the final standard was produced. The result of that is that we have a new invention, a prototype standard.

Copies of this prototype standard were subsequently distributed to all the nations of the world who had participated in the Convention, and two of these copies came to the United States, two meters and two kilogrammes. One of these meters and one of these kilogrammes were brought over from Paris by Mr. Graham, of the Geodetic Survey, and were deposited in the archives of the Bureau of Weights and Measures. They bore the seal of the United States Minister at Paris, and of Prof. Davidson and Dr. Gould, who were our representatives at the time.

On the 2d day of January, 1890, these standards were taken to the Executive Mansion, to the Cabinet room, and were opened. The seals were broken by the President of the United States, witnessed by the Secretary of State and the Secretary of the Treasury, and also by twenty or thirty distinguished scientific men interested in the subject of weights and measures, who came from various parts of the country.

I mention these circumstances because many of you may not know that these standards have been received. Models have been constructed of these standards, and I have brought these copies here so that they may be inspected, and you will pardon me if I take the time to show them to this Convention. The meter came to us in a case very much like this [showing the copy]. Outside it represents the appearance of being simply a rod. After the covers of the box are removed a recess is seen in which is contained the meter. In this case I have a model. Both package and contents are made in imitation of the original, so that we may say that we have the original here, since you could not distinguish the one from the other, so far as appearance is concerned. On lifting off the cap, as you see I do here, you find the meter in its place, and I will lift this out. This model, I may say, is made of platinum and iridium, coated with aluminium, so that it resembles very closely the appearance of the original—90 per cent platinum and 10 per cent iridium. I can take this out, as I do now, and show you how it looks. It is in the form of a bar, but it has a peculiar construction. It is made in the form of a cross section. It is an exact model in length and dimensions, and it is in the form of the letter H in the cross section—that is, any stress that the bar may receive will be compensated for, so that it may simply bend in one direction and then in another; and a short distance from each end we have fine lines, and they represent the length of the meter.

* Address delivered by Prof. T. C. Mendenhall, Superintendent of the U. S. Coast and Geodetic Survey, before the Pharmacopœial Convention held at Washington, May 9th, 1890.

The kilogramme is also constructed with great simplicity, very different from the old standard, and of peculiar form. The old model had hooks. In fact, the standard troy pound of Philadelphia was most imperfect, being hollow and loaded with little bits of wire, and it was adjusted by taking them out and putting them in. Just how many times they have been out since the original was made it is, of course, difficult for us to say. It is the general belief that they have never been out, but it is impossible to assert this with absolute certainty. Yet it is the general belief that it has never been tampered with. Still, it ceases to be such a standard as ought to be legally recognized.

The new kilogramme is as perfect in form as could be imagined. Here is a model of it, looking exactly like the original. Its diameter is equal to its altitude. It is made of platinum 90 per cent and iridium 10 per cent. The general construction of that model is very simple, as simple perhaps as could be devised as a standard for mass. Nothing, perhaps, more simple could have been devised than this.

The receipt of these standards constitutes an epoch in the history of weights and measures in this country. It has afforded me very great pleasure to show you these models, and to speak of their receipt. In conclusion, I want to say, Mr. President, that we have prepared recently a table, which I have here, for converting the customary weights and measures into the metric weights and measures. A great many kinds of such tables have been prepared at various times, but this one has been used for the last two or three months, and has been found to be the most convenient that has been used for converting one system into another. I would say that it is the most convenient that has yet been prepared, and copies of these tables have been sent here, and if any of the members of this Convention wish to obtain them they can be furnished without cost if the members will meet me at my office.

[Prof. Mendenhall's address was listened to with the greatest interest, and the thanks of the Convention were tendered to him at its conclusion.—ED. AM. DRUGG.]

Testing Diuretin.

DR. VULPIUS has recently made a detailed study of this new "diuretic," which was reported to be a combination of theobromine with sodium salicylate. Dr. Vulpius finds that the compound is not analogous to the caffeine combination with sodium salicylate, benzoate, or cinamate, but that it is a well-characterized compound of theobromine-sodium and salicylate of sodium in molecular proportions. The two substances may, in fact, be supposed to be brought, in molecular proportion, into aqueous solution, which is then evaporated. In determining the value of a sample of the compound—and, according to a remark by Dr. Vulpius, there appear to be several qualities on the market—the most important criteria are the quantity of theobromine and its purity, and also the amount of salicylic acid. The amount of theobromine is best detected by the following method, based upon the difficult solubility (1:1,600) of the alkaloid. The aqueous solution of the compound is supersaturated with dilute acid, and then again rendered alkaline by dilute solution of ammonia, which causes the precipitation of theobromine, while salicylate of sodium now remains in solution, together with a little theobromine, the solubility of which in water is increased by the presence of the salicylate. Experiment has shown that the quantity thus retained is 0.130 Gm. for every 2 Gm. of diuretin. The separated theobromine is collected on a filter, washed, dried, and weighed. The resulting weight, increased by 0.130, indicates the quantity of theobromine present in 2 Gm. of the diuretin.

Dr. Vulpius recommends to require, not the full theoretical quantity (49.7 per cent) of alkaloid, but only 46.5 per cent, so that 2 Gm. of diuretin would have to yield 0.8 Gm. of theobromine.

The purity of the substance is demonstrated by its being sublimable, by leaving no residue on combustion, and by its ready and complete solubility in solution of soda.

The amount of salicylic acid is determined by acidulating the aqueous solution (filtrate and washings) remaining after the separation of theobromine, and contained in a separatory funnel, then agitating it with ether, which dissolves out the salicylic acid. On evaporation, the acid is left behind and may be weighed. It should not be less than 0.77 Gm. (theoretically 0.762) from 2 Gm. of diuretin.

If theobromine is to be looked for merely qualitatively, it may first be separated as directed above, then dissolved by addition of solution of potassa, and shaken out with chloroform. If 1 Gm. of diuretin was originally used, the residue on evaporating the chloroform should not weigh more than 0.005 Gm. A larger amount would point to the probable presence of caffeine, which is much more soluble in chloroform.—After *Pharm. Zeitung*.

Washing-blue has a rival in a blue soap, which is produced in Germany. The way in which it is made is to add a solution of aniline green in glacial acetic acid to the soap basis. The alkali of the soap changes the green to blue, and gives the soap a uniform color.

HOW TO CUT THICK GLASS TUBING.

DR. F. MUCK draws attention to an instrument which appears to be but little known, but which is the best contrivance for evenly cutting a piece of thick glass tubing. C. Gerhardt, dealer in chemical apparatus at Bonn, saw it first years ago in the hands of a travelling agent, and has now put it on the market. It will no doubt soon be for sale by our dealers in chemical apparatus.

The tool consists of a rod, bearing near one end a good



glazier's diamond firmly set. Upon the rod, a handle with disc at one end may be adjusted in any position by means of the set screw.

To use the instrument, one end of the glass tube to be cut should be smooth and squarely cut. If neither end is true, then a piece of pasteboard tubing can be fastened to one end.

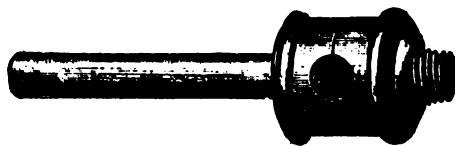
The diamond end of the rod is now inserted into the glass tube up to the point where the latter is to be cut, and the handle, with disc in contact with the smooth end of the tube, firmly clamped upon the rod by the set screw. The rod is then rotated so that the diamond may make a clean cut over the inner surface. Upon pulling upon both ends, the tube will squarely break off at the cut.—*Zeitsch. f. anal. Chem.*, 1890, 142.

NEW ALCOHOL AND BENZIN LAMPS.

IN the last issue of the *Helfenberg Annalen* (for 1889, published in 1890) a new alcohol lamp is described which possesses several advantages over those previously used. Its upper portion resembles a Bunsen burner, and, indeed, serves for allowing a supply of air to mingle with the alcohol diffused through the wick, whereby the heat and draught are materially increased.

When the burner has been properly charged with a wick and with alcohol, and it is to be lit, the adjustable top of the tube is screwed up a trifle, and a little alcohol poured on the end of the wick from above. When this is ignited, it soon draws up more alcohol from the reservoir. There is a similar lamp, differing only by having an arrangement which keeps the reservoir of benzin surrounded with a current of air.

The new burners, with iron stands for holding vessels to be placed above them, are made by C. Barthel at Niederpoyritz, near Dresden, and may be ordered through dealers in chemical apparatus.



THOMPSON'S ATMOSPHERIC GAS JET.

MR. C. THOMPSON, pharmaceutical chemist, Sparkbrook, Birmingham, introduces a gas jet, the exact size and design of which are shown in the accompanying engraving. By a simple motion of the sliding shield at the base of the jet the supply of air is regulated or entirely cut off. In the latter case an ordinary white flame is obtained; but when the full quantity of air is admitted a blow-pipe flame of intense heat is provided, which will serve many purposes at the dispensing counter. For sealing wax this Bunsen flame is much superior to the usual jet.

Estimation of Water in Phenol.

A SAMPLE of crude carbolic acid (i.e., the liquid remaining after crystallization of true phenol, and consisting of cresol and higher homologues), when tested by three methods—(No. 1), by distillation; (No. 2), by agitating 1 volume with 3 volumes of saturated salt solution; (No. 3), by agitation with equal volumes of 48 to 50 per cent of sulphuric acid (conc.)—gave the following results: No. 1, water, 8.6 per cent; No. 2, water, 8.00 per cent; No. 3, water, 8.25 per cent.

The distillation process gives the true percentage of water if the distillate be not observed too late; next to this is the test with vitriol.—J. A. WILSON, in *Chem. News* (May 16th).

How Drugs are Imported.

MR. JOHN C. UMNEY described, at a meeting of the School of Pharmacy Students' Association, the various forms in which drugs reach the London market, and the information cannot fail to interest many of our readers who rarely have opportunities for examining the original packages.

Alcohol.—It is largely exported to this country [England; this is to be understood elsewhere in this article] from Germany, in puncheons containing about 120 gallons of 90 per cent to 92 per cent real alcoholic strength. The contents of these puncheons are determined by gaugers. Though it may seem at first sight curious that the Customs should depend solely on this method of determining the contents for the impost of duty, confirmation by weighing shows with what marvellous accuracy this operation is usually carried out.

Aloes.—The Barbadoes variety is usually imported in gourds varying in weight from 2 to 20 pounds, into which the drug is poured in a melted condition, the hole being closed by a piece of calico tacked over the opening. Those sent from Curaçoa are packed in square boxes averaging in weight about 75 pounds.

Socotrine is imported (principally by way of Bombay) in tin-lined cases, generally those that have contained Martell's brandy, this firm's trade mark being usually visible on the side of the package.

Another kind, which some pharmacognosists are of opinion is produced from the same variety of aloe as that grown in Barbadoes, reaches us in skins, usually those of the goat, sometimes monkey, whilst a third kind of package, the variety of which it is not easy to identify, is met with in tins similar to those which are familiar to you all as "castor-oil tins."

Almonds (Bitter).—The finest are imported from Mogador, and reach this country packed in serons of about 2 cwt. each. A considerable quantity is also sent from Sicily. The former are largely used for the production of the fixed oil of almonds, and the cake, after expression, for the preparation of the essential oil.

Balsam of Canada, formerly imported from Lower Canada in large barrels and kegs, is now seen almost entirely in tins averaging about 40 pounds' weight.

Balsam of Tolu is now no longer imported in calabashes, as at the beginning of this century, but in cylindrical tins of about 6 inches diameter, weighing about 10 pounds.

Camphor (Refined).—That exported to this country from Germany is almost always in bells of about 5 pounds' weight, only about one-third the size of those sublimed in England. A few Continental refiners, however, send the drug in imitation of "English Bells," which are of about 14 pounds' weight.

Cantharides reach this country in casks, often containing as much as 5 cwt., principally by way of Trieste. The "Chinese Flies" (*Mylabris*) are usually sent in boxes of 100 pounds' weight.

Cassia Bark is exported to this country in enormous quantities, principally from Canton, packed in loose bundles, whilst the varieties shipped from the Philippines usually reach Spain by way of Cadiz.

Castor Oil is sent to this country in enormous quantities from Calcutta in tins, 4 in a case, of about 40 pounds each. It is being increasingly exported from Leghorn.

Catechu.—Both the black and pale are exported to this country in very large quantities from India and Straits Settlements for dyeing and tanning purposes. Both varieties arrive in "mats" of aggregated masses, a small proportion of the paler variety coming also in what are known in trade as "gambier-free cubes."

Chamomile Flowers.—The bulk of the imported flowers is produced in Belgium and is exported in one-hundred-weight bags. France has recently taken up the growing of this drug, and is surpassing Belgium both in the size and color of its flowers.

Chiretta is imported in flattish bundles, about 2 to 3 feet long, tied with a slip of bamboo. It has been found occasionally "false-packed," the outside being chiretta, the inside some other herb; in the case of the bundle exhibited the interior consisting entirely of *Rubia tinctorum* (madder).

Cinchona Barks.—The "wild" bark from the forests of Bolivia and Ecuador is now almost a thing of the past, the collection of it being but poorly remunerative on account of the competition with the cultivated barks of the same continent and those of Java and Ceylon. Very few hide serons are now seen as compared with years since, when this package was almost universally adopted. The Indian variety of bark reaches us either in pressed packed bales, when consisting of shavings (chiefly used in quinine manufacture), or in well-made cases if of selected quills for use by pharmacists.

Cinnamon Bark is always repacked, or "worked," as it is termed, on its arrival in the dock warehouses of London. The "small" cinnamon sold for pharmacists' use consists of the portions broken off in this process of work-

ing, which comprises repacking and trimming the bundles.

Civet is exported from the coast of Abyssinia in horns, in which the curious secretion is placed after collection.

Coca Leaves.—The South American "wild" coca is imported principally in bales of plaited rush, whilst that from Java reaches this country in very excellent condition in lead-lined cases. English planters in Ceylon, who have become dissatisfied with the low rates ruling for cinchona barks, have taken up the cultivation of coca, and are now growing for export to the London market that known among trade varieties as Bolivian.

Cod-Liver Oil.—The Norwegian oil, of which upwards of 5,000 casks are used medicinally every year, is always imported in tin cylinders of 25 gallons each, provided with a screw plug, with a wooden exterior. The package is a perfectly "unique" one. The inferior oil that reaches this country from Newfoundland is in unlined casks of irregular size.

Colocynth.—The whole unpeeled fruit is imported from Mogador in very small quantities, the principal use in this country being for the pharmacist's show jar. The usual method of importation is as the peeled fruit, that sent from Turkey commanding nearly twice the price of that from Mogador. The difference in the color of the seeds, which causes this variation in price, as it prevents the latter variety from being used for preparing a pale powder, appears to be due to the different degree of ripeness of the seed, but is so constant as to be relied upon by buyers as their chief distinguishing feature.

Gum Acacia.—The fine white gums, which now, unfortunately, are almost absent from English pharmacy, formerly reached us in serons weighing about 3 to 4 cwt. That now imported, of very inferior quality, both as regards color and more especially adhesive properties, is shipped from the Egyptian ports in cases and barrels of varying size. A gum very much resembling in appearance, at any rate, the old Kordofan gum, is now reaching this country by way of Mogador, but the exact district of its actual production is uncertain.

Gum Benzoin.—The Siam variety, used principally for the production of incense, and distinguished by its very agreeable vanilla odor, is imported in cases of aggregated tears. That from Sumatra is usually sent to this country in boxes containing about 2 cwt.

Honey.—Many countries furnish us with honey, each having its own distinctive flavor and character; and so easily are these distinguished by those who are accustomed to handle them that with ease the experienced buyer could tell blindfolded whether the sample were Californian, Chilian, West Indian, French, or English. The Californian variety reaches us in tins resembling castor-oil tins, two of such being packed in a case, the Chilian in small kegs of 1½ cwt., that from Jamaica in barrels of 3½ cwt., and the French in small kegs of 35 kilos.

Ipecacuanha Root, after drying, is stowed in a package called a "seron," made of undressed cowhide, shaped, as you will see from the one shown, by pressure whilst still fresh. A considerable quantity of this drug now reaches this country from Rio in canvas instead of hide serons.

Manna is exported to this country, principally from Palermo, in tin boxes weighing about 14 pounds each.

Mercury is sent from Spain and Italy in wrought-iron bottles, the appearance of which is quite familiar to all of you, the contents of which weigh 75 pounds, most of the import into this country being under the control of Rothschild & Sons.

Musk.—The finest variety is obtained from Thibet, and reaches this country in small caddies, the value of one of which, such as I have here, if of the best quality, amounts to between £80 and £100 sterling.

Oils.—*Oils of Cajuput, Citronella, and Verbena* are usually sent to this country in bottles which have been previously exported, filled with brandy and spirits, to the various localities where the oils are distilled.

Oils of Lemon and Bergamot are imported in coppers of 12½, 25, or even up to 100 pounds' weight, principally from Sicily (Palermo and Messina). These "coppers" are weighted at the bottom with lead in order to strengthen them, and consequently the oils often contain minute traces of that metal.

Olive Oil.—The finest quality is now imported in pipes (about 110 gallons) from Leghorn. It is very seldom seen now in 10 and 20 gallon wickered vessels, known respectively as "half jars" and "jars."

Star Anise Oil is exported very largely from Macao, China (though at the present time a considerable quantity is being manufactured in Tonquin), in curiously-shaped leaden tins having two handles, and bearing the label of their manufacturer. The contents of these tins average about 16 pounds, and they are usually packed 4 in a case.

Orris Root of very fair quality is imported to some extent from Mogador, but large shipments of the finest pale root are made from Leghorn. The Mogador variety is in serons of about 3 cwt. each.

Otto of Rose is exported to this country in vases varying

in capacity from one-half to 1 or 2 kilos. They are generally invoiced from Kezanlik (which is the centre of the otto-producing district) in Turkish ounces, that ounce exceeding the avoirdupois by 11.3 per cent (= 494.7 grains). The average yearly export is 4,000 pounds avoirdupois, equal to about £60,000 sterling.

Rhubarb Root is imported almost entirely from China (the greater part of that produced in England being consumed abroad, as its use in British pharmacy is precluded by the Pharmacopœia directions). The Canton and Shenzi rhubarbs are imported in cases varying in weight from 1 to 3 cwt., and are of very variable quality, whole chests sometimes affording but a few pounds of sound root.

Saffron.—The best quality of this drug is exported from Valencia, and is sent to this country in tin-lined cases containing about 100 pounds' weight. The Alicante and Barcelona saffron is invariably "loaded" with carbonate of calcium or baryta, made adherent with glycerin or some other sticky substance.

Sarsaparilla.—The Jamaica and Lima varieties are imported in bundles of about 2 pounds each, tied together to form a bale of about 125 pounds' weight; whilst that from Honduras, after being bundled, is formed into a package with cowhide ends.

Senna.—The Tinnevely variety arrives in pressed packed bales, resorted to in order to reduce the cubical space occupied to a minimum, freightage being charged by vessels, as you are doubtless aware, by this method, and not by weight as in overland traffic. The Alexandrian variety comes chiefly in cases.

Spermaceti.—That shipped from America is in boxes of 60 pounds' weight. A considerable amount is refined here, a large quantity of sperm oil very rich in spermaceti being shipped to this country from the Seychelle Islands and Mauritius.

Tamarinds.—The finest variety are shipped from the Barbadoes in casks, inferior qualities being imported from St. Kitt's, both being known as West Indian. A black variety is imported from the East Indies and also from Egypt in a dried, pressed condition, these being used principally by manufacturers of sauces.

Vanillas are generally seen in bundles tied at the middle and both ends, though rarely only in the centre. Mauritius contributes a large proportion both to our market and those of the Continent. The Seychelles also contribute largely excellent pods, both as regards quality and size.

Wax.—The finest French wax is usually imported in bars of 4 or 5 pounds' weight; that from Jamaica usually in irregular-sized saucers resembling the English.

Woods.—At the London docks a large area is set apart for the reception of dyewoods, where, among others, are stored quassia and sassafras. Valuable wood, however, such as santal, is usually packed in what are termed "robbers"—large upright bales. All these woods are cut by machinery before they are seen in the small pieces familiar to pharmacists.—*Pharm. Jour. and Trans.*

Coffee Inebriety.

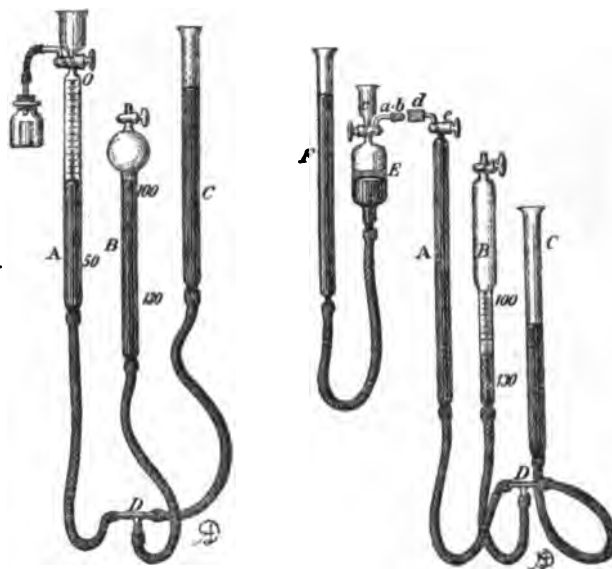
DR. MENDEL, of Berlin, has lately published a clinical study of this neurosis, his observations being made upon the women of the working population in and about Essen. He found large numbers of women who consumed over a pound of coffee in a week, and some men drank considerably more, besides beer and wine. The leading symptoms were profound depression of spirits, and frequent headaches, with insomnia. A strong dose of coffee would relieve this for a time, then it would return. The muscles would become weak and trembling, and the hands would tremble when at rest. An increasing aversion to labor and any steady work was noticeable. The heart's action was rapid and irregular, and palpitations and a heavy feeling in the precordial region were present. Dyspepsia of an extreme nervous type was also present. Acute rosacea was common in these cases. These symptoms constantly grow worse, and are only relieved by large quantities of coffee, generally of the infusion. In some cases the tincture was used. The victims suffer so seriously that they dare not abandon it for fear of death. Where brandy is taken, only temporary relief follows. The face becomes sallow, and the hands and feet cold, and an expression of dread and agony settles over the countenance, only relieved by using strong doses of coffee. In all these cases acute inflammations are likely to appear any time. An injury of any part of the body is the starting point for inflammations of an erysipelatous character. Melancholy and hysteria are present in all cases. Coffee inebriates are more common among the neurasthenics, and are more concealed because the effects of excessive doses of coffee are obscure and largely unknown. Many opium and alcoholic cases have an early history of excessive use of coffee, and are always more degenerate and difficult to treat. A very wide field for future study opens up in this direction.—*The Quarterly Journal of Inebriety*, April, 1890.

LUNGE'S GAS VOLUMETER.

PROF. LUNGE, whose valuable nitrometer, either in its original form or in the modifications proposed by himself or by Prof. Allen, is now too well known to require renewed description, has recently added a further improvement, which renders the use of the instrument independent of temperature, pressure, or other conditions, and enables the operator to read off the volume of gas at once as compared with the standard.

The improvement consists in this, that between the gas-generating tube A and the open balance tube C there is interposed a third tube, B, ending above in a globe with accurately ground glass stopcock. This globe is of such a capacity that it will hold 100 C.c. to a mark situated a short distance inside of the tube. Below this mark the graduation, in one-tenth C.c., is continued for 30 to 40 C.c. further. The instrument is adjusted, when it is to be used, by observing the barometer and thermometer, and finding (by calculation, or, more conveniently, from tables) the volume which 100 C.c. of dry air would occupy under the existing barometric and thermometric conditions. The tube is then raised or lowered, with open stopcock, until the level of the mercury is at the exact point indicating this volume, and the stopcock then closed. If the stopcock is tight, the confined volume of air furnishes—when the liquids in tubes A and C are brought to a level—the reduction of the liberated gas to 0° C. and 760 Mm. pressure.

When moist gases are to be measured in the nitrometer A, a drop of water must be introduced in the globe of B. But when dry gases are given off in the nitrometer—for instance, when nitrogen dioxide is given off over sulphuric acid—a drop of the latter must be put in the globe.



Lunge's Gas Volumeter.

In the former case, when a drop of water is added, the tension of aqueous vapor at the existing temperature must be deducted from the barometric reading.

The three tubes are held by strong clamps on a stout stand, and the rubber tubing must be very strong and durable. The level of the mercury in tube B must be adjusted every day, or before every series of experiments. The quantity of air locked up in it is such that it would be exactly 100 C.c. at 0° C. and 760 Mm. pressure. Hence it is only necessary to lift or depress the tube C sufficiently, while the stopcock of B is open, to bring the mercury exactly to the mark 100.

Assuming that some nitrogen determination has been made (for instance, in urea) in tube A. When the generation of gas has ceased, the middle tube B is raised or lowered until the mercury stands exactly at 100, and clamped fast in this position. The next object is to adjust A so that the liquid in it will be on a level with that of the mercury in B, so, however, that the latter remains at 100. This is accomplished by raising C. It is usually necessary to make several readjustments before the liquids in A and B are exactly alike with the mercury at 100.

The above apparatus is intended primarily for operations in which mercury is used as filling liquid for the tubes. If another liquid besides mercury is used in the generating tube, the weight of it must be taken into consideration.

The use of this form of gas volumeter renders all calculated tables for reducing the various gases to volume at normal temperature and pressure unnecessary.

The apparatus is manufactured by C. Desaga in Heidelberg. Prof. Lunge has arranged that the manufacturer will be enabled to sell ready-prepared air-volume tubes, which need not be adjusted by the purchaser.—*After Chem. Centralbl.*

Cologne Water.

THE following formulæ are given by Hager in his latest work, "Manuale Pharmaceuticum" (6th edit., 8vo, Leipzig, 1890, Part I.):

I. Oil of Lavender, finest	1 part.
" " Rosemary	1 "
" " Neroli	5 parts.
" " Lemon	15 "
" " Bergamot	50 "
Alcohol [deodorized]	1,000 "

Mix, set aside for one month in a dark place, then filter.

II. Oil of Lavender, finest	2 Gm.
" " Neroli	1 "
" " Peppermint	0.5 "
" " Lemon	20 "
" " Bergamot	50 "
Musk	0.033 "
Alcohol [deodorized]	1,200 "

Mix, set aside a few days, repeatedly shaking, then filter. The musk is to be saturated with a little of the water before being added.

Macerate 7,500 Gm. of the alcohol with the aromatics, properly comminuted if solid. Then distil and collect 5,000 Gm. To the residue in the still add 3,000 Gm. more of alcohol and distil again. [The distillate may be suitably diluted.]

III. Oil of Lavender, finest	2 Gm.
" " Neroli	2 "
" " Lemon	10 "
" " Bergamot	25 "
Musk	0.015 "
Alcohol [deodorized]	500 "

Directions same as in preceding.

IV. The following is to be prepared by distillation:

Nutmeg	5 Gm.
Cardamom	5 "
Cinnamon	5 "
Melissa [herb]	50 "
Vanilla	2.5 "
Coriander	5 "
Oil of Bergamot	80 "
" " Lemon	15 "
" " Lavender	15 "
" " Thyme	10 "
" " Rosemary	5 "
" " Cloves	2 "
" " Neroli	1.5 "
Balsam Peru	5 "
Storax [liquid]	5 "
Alcohol [deodorized]	q. s.

India-Rubber Plasters.

MESSRS. A. SCHNEEGANS and M. CORNEILLE, pharmacists of the Town Hospital of Strassburg, state that they have for some time past been experimenting with a view to replacing purchased caoutchouc plaster with plasters made more economically on the premises, and in this they claim to have succeeded, plasters made according to the formulæ published by them being actually in use and much appreciated in the clinic of the hospital.

The method of operating is described as very simple, requiring no special apparatus, and such as to be remunerative in an ordinary pharmaceutical laboratory. As the number of preparations that can be made with advantage by the pharmacist is daily decreasing, the authors considered it desirable to let the result of their experiments be known.

The basis of the plasters adopted is a mixture of lanolin, benzoated tallow, caoutchouc, and dammar resin in variable proportions. The proportions of caoutchouc and dammar resin are kept as small as possible consistent with securing a good adherent mass; the lanolin and tallow preponderate, which excludes irritating action upon the skin. A slight addition of glycerin prevents the plaster from becoming dry and brittle under the action of the atmosphere.

The caoutchouc is incorporated in the form of a solution, which is made by macerating the flake india rubber of commerce in five times its weight of benzin, with frequent agitation. The india rubber swells up at first considerably, but dissolves entirely after three or four days. The following are the formulæ adopted, and the manner of operating:

Zinc Oxide Plaster (20 per cent).

Dammar Resin	20 parts.
Benzoated Tallow	25 "
Lanolin	15 "
Caoutchouc	8 "
Glycerin	12 "
Zinc Oxide	20 "

The resin is melted over a bare fire; then the tallow is added, and the whole is strained through three or four

thicknesses of gauze. With this mass, whilst still liquid, the lanolin and caoutchouc solution are incorporated under continual agitation. A very homogeneous mass is thus obtained, which is heated with the necessary precautions, over a water-bath, to eliminate the benzin. After complete evaporation of the benzin, which on the large scale can be recovered by distillation, the zinc oxide, previously made into a fine paste with the glycerin, is added. When the mass is uniform it is allowed to stand for a time, while warm, to permit bubbles of air to escape, and it is then spread upon shirting. The mass should not be too warm when spread, or it may soak through the shirting; the thickness of the layer should be from that of a sheet of writing paper to that of a playing card. The plaster is dried in the air during two or three days, then covered with gauze, rolled, and wrapped in paper.

Mercury Plaster (20 per cent).

Dammar Resin	25 parts.
Benzoated Tallow	12 "
White Wax	15 "
Lanolin	20 "
Caoutchouc	8 "
Metallic Mercury	20 "

The mercury is extinguished with the lanolin. The mixture, which is at first light gray, darkens during the trituration, and finally becomes blue gray. The resin is melted with the tallow and wax, strained through gauze, the solution of caoutchouc added, and the benzin driven off on a water-bath; to this warm mixture the mercurial lanolin is added and the whole worked up together. It is then allowed to stand at a gentle heat for the escape of air bubbles, and the mass is spread when it has almost lost fluidity. The plasters are kept in tin boxes in a cool place.

Mercury and Zinc Plaster (20 : 10 per cent).

Dammar Resin	20 parts.
Benzoated Tallow	12 "
White Wax	10 "
Caoutchouc	8 "
Lanolin	20 "
Mercury	20 "
Zinc Oxide	10 "

The mercury is extinguished with the lanolin, the zinc oxide rubbed in and then added to the lukewarm mixture of the other constituents.

Iodoform Plaster (20 per cent).

Dammar Resin	15 parts.
Benzoated Tallow	30 "
Lanolin	20 "
Caoutchouc	5 "
Glycerin	10 "
Iodoform	20 "

Prepared in the same way as the zinc plaster. The iodoform is triturated with the glycerin and added to the mass, suitably cooled to avoid the volatilization of the iodoform. The plaster is preserved in tin cases.

Boracic Acid Plaster (20 per cent).

Dammar Resin	20 parts.
Benzoated Tallow	25 "
White Wax	15 "
Caoutchouc	8 "
Lanolin	12 "
Boracic Acid	20 "

The resin, tallow, and wax are melted together, and the solution of caoutchouc added to the mixture while still liquid. After driving off the benzin on a water-bath, the boracic acid, rubbed up with the lanolin, is thoroughly incorporated with the mass.

The formula for Salicylic Acid Plaster corresponds to that for Boracic Acid Plaster.

Ichthyol Plaster (20 per cent).

Dammar Resin	20 parts.
Benzoated Tallow	20 "
White Wax	20 "
Caoutchouc	8 "
Lanolin	12 "
Ichthyol (Ichthyol-Sodium)	20 "

The ichthyol is melted upon a water-bath with the lanolin and incorporated with the liquid mixture of the other constituents.—*Pharm. Jour.*, from *Jour. d. Pharm. von Elsass-Lothringen*.

Antipyrin Incompatibility.—M. Tardy, a French pharmaceutical assistant, says that in a mixture containing antipyrin and carbolic acid an insoluble oily liquid will separate, and that the upper and watery layer will contain most of the antipyrin, and the lower, oily stratum will contain most of the carbolic acid; that both are somewhat altered in appearance and odor, and that the properties of both are probably impaired.

Cosmetics for the Physician.

THE secrets of the toilet, the arts by which lovely woman hides incipient corrugations, effaces blemishes, and softens and beautifies her cutaneous apparatus and its appendages generally, are rarely investigated by the physician. He contents himself with removing some particularly obtrusive mark, pulling out superfluous hairs, or trying, with spirits and Spanish flies, to fasten in the too deciduous hair. Dr. H. Paschkis, of Vienna, however, has attempted to inaugurate a new era in this line, and has written a book, "Kosmetik für Aerzte," which is intended to enable the physician to add to the æsthetic enjoyment as well as physical welfare of humanity. Paschkis' book is said by a reviewer in the *Deutsche Medizinische Zeitung* to be a thoroughly scientific one. Its formulæ are based upon dermatological knowledge and pharmaceutical experience. As illustrations we are given four formulæ for that popular domestic article, "cold cream."

One of them is as follows:

R Lanolini	10.0
Boracis	1.0
Aquæ Rosmarini	100.0

M. Sig.: Lanolin milk.

A formula for seborrhœa is the following:

R Potassii Carbonatis	10.0
Aquæ Destillat.	100.0
Olei Cinnamomi.	gtt. 2.0
Olei Rosmarini.	gt. 1.0

M.

For warts our scientific book of beauty prescribes:

R Acidi Salicylici	5.0
Collodii	20.0

M.

For sweating feet, 5 to 10 per cent solutions of chromic acid are recommended.

For dandruff and baldness there are, of course, numerous prescriptions; but, we regret to say, no specific is announced. For a simple wash, as preventive of dandruff, we find:

R Potassii Carbonatis	2.0
Aquæ	100.0

The formula for Hebra's dandruff water is also given, viz.:

R Spts. Ætheris	100.0
Tinct. Benzoini	15.0

M.

Mouth washes and tooth powders are given, the author warning his readers especially against the use of salicylic acid for these purposes.

We have not space to describe the merits of Dr. Paschkis' work in further detail. But it is evident that, equipped therewith, the physician can enter on even terms the contest against the balms of Récamier, the secret washes of Lola Montez, and the roborant lotions of the Sutherland and other sisters. — *Med. Rec.*

Examination of Crude Phenol and Cresol.

It is pointed out that the method of testing crude phenols and cresols, by shaking with a double volume of 9-per-cent soda and measuring the volume of undissolved liquid, either with or without the addition of light petroleum, is untrustworthy because, firstly, the quantity of soda is insufficient for material containing more than 60 per cent of phenol; secondly, cresol, although insoluble in petroleum in the presence of water, is soluble when the petroleum contains 10 to 20 per cent of coal-tar oils; moreover, the higher homologues of cresol are soluble in any case; thirdly, the water in the crude phenol is taken up by the alkali and is reckoned as phenol; and fourthly, material containing even 2 to 3 per cent of naphthalene gives a perfectly clear solution. The method is more workable if 4 volumes of 10-per-cent soda are used, the alkaline layer separated, neutralized with dilute acid, agitated with a measured volume of benzene (benzol), and the volume read off. In Williams' method for examining carbolic powders the quantity of alkali is also insufficient for treating rich material, whilst in Tidy's method not only is this the case, but also the solubility of the coal-tar acids in sodium sulphate is overlooked and there is loss by volatilization of the phenol. In Toth's method the strong alkali, of specific gravity 1.250-1.300, gives rise to a strong solution of the cresoxides, which dissolve large quantities of hydrocarbons; moreover, any light hydrocarbons present could hold the free phenols in suspension, and so prevent their solution in the alkali. Foreestimating water in crude phenols, agitation of 50 C.c. with 30 to 50 C.c. of benzene (benzol) and 30 C.c. of 50-per-cent sulphuric acid is recommended; the sulphuric acid is better than calcium chloride, which in its turn is better than sodium chloride. — W. W. STAVELEY, in *Chem. Zeit.* and *J. Chem. Soc.*

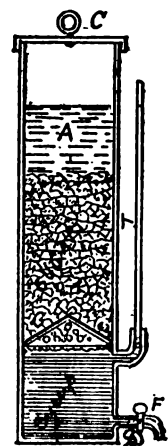
CONTINUOUS PREPARATION OF SYRUPS BY COLD SATURATION.

M. BOUVET, pharmacist of Autun, describes in the *Répertoire de Pharmacie* for May an apparatus used by him for two years past in preparing syrups by cold saturation. This apparatus consists of a cylinder, of copper or block tin, A, of which the height should be about four times its diameter. At about one-fourth of its height it is divided into two parts by an open frame, G, which is covered with a strainer. A tube, T, is inserted in the manner shown, and serves as a gauge of the height of the liquid in the cylinder. A stopcock, F, and a cover, C, complete the apparatus.

When simple syrup is to be made, the upper chamber is filled with cut or coarsely broken sugar, and water poured over the same. As it flows off by the stopcock the liquid is returned to the cylinder, and this is repeated until it comes off saturated. When this is the case a fresh portion of water is poured on the sugar, care being taken that the latter shall always be in excess.

M. Bouvet says: "I have shown the dividing frame as conical in shape, because it thus affords a larger area of filtration; but, aside from this advantage, a flat one would answer as well. It is not permanently fixed in the cylinder, but should be of such size that when the strainer is put on it and turned under the inferior edge it will retain its position in the cylinder by friction alone. Care should be taken to so arrange the strainer that no liquid escapes from the cylinder except through its meshes."

This apparatus may be used in a similar manner for preparing other syrups, such as orange flower, tolu, tar, etc. The author states that for more than two years he has preserved syrups made with this apparatus in vessels covered with nothing but paper, and there has not been the least alteration; neither fermentation, acidity, nor mould occurring. — *Nat. Drugg.*



PERFUME-MAKING IN NICE.

THE method of making perfumes in Nice is described as follows by the British consul in that town: The first process in the manufacture of perfume from flowers and herbs is the extraction of the essential oil by distillation. A large copper vessel or alembic is filled with water to about two-thirds of its capacity; the flowers to be treated are then introduced, and it is hermetically [sic] closed. It is placed on a fire, gas or steam being mostly used for this purpose in Nice. Steam is thus generated in the cylinder, and is carried by means of a pipe into a second cylinder, which is constantly kept replenished with cold water, and is furnished with an overflow cock. The pipe, in its passage through this second cylinder, assumes the form of a coil. This coil ends in a cock at the bottom of the cylinder, from which the volatile essence exudes drop by drop as the steam becomes condensed in its passage through the coil.

In this manner the essence is collected in a small glass vessel, while at the same time the water containing a small portion of the scent, and which still remains in the alembic aforesaid, is itself perfumed, and becomes the rose water or orange-flower water, etc., of trade.

All flowers are not susceptible of this treatment; some of them, such as jessamine, violet, cassie, and tuberose, have to be treated by a different process.

Of the flowers producing essences the orange flower yields 1 Gm. of essence for 1 kilo of flowers. This oil is styled "neroli," and is the principal essence produced in the district between the Var and the Italian frontier.

There are two processes used for the purpose of extracting perfume from flowers which do not contain volatile essence.

The first may be described as the cold process, and the second as the hot process.

The former is generally used for cassie (*Acacia Farnesiana*), jessamine, jonquils, tuberose, violets, and some other flowers.

Freshly gathered flowers are placed upon a layer of pure lard, a quarter of an inch in thickness, spread over a sheet of glass about 2 feet square, which is framed in wood and forms a tray. These trays, sometimes some forty or fifty together, are then piled upon one another, the flowers are changed every twelve, eighteen, or twenty-four hours, according to circumstances, and the process is thus continued until the lard is sufficiently charged with perfume. Jessamine and tuberose are frequently changed as often as fifty times before the lard is considered to be sufficiently impregnated, cassie and violets from thirty to forty times, and jonquils about twenty times only. In the hot process 20 kilos of grease are placed in a copper vessel, together with some 5 kilos of

flowers; the vessel is then placed over a slow fire, and the contents are well stirred. After allowing the compound to boil for ten minutes, the vessel is left to cool for some hours; an additional 5 kilos of flowers are then added, and the process is repeated until the fat has absorbed the requisite amount of perfume; the hot liquid is then poured through a sieve, and the greasy flower paste that remains is subjected to hydraulic pressure. It is in these two ways that the *pommades* of trade are produced.

The machinery used in the production of *extraits* from the *pommades* is very simple, and the only apparatus calling for special notice is the *batteuse à extraits*, by which the perfume is conveyed from the impregnated fat into the alcohol, and which is shown in our illustration.

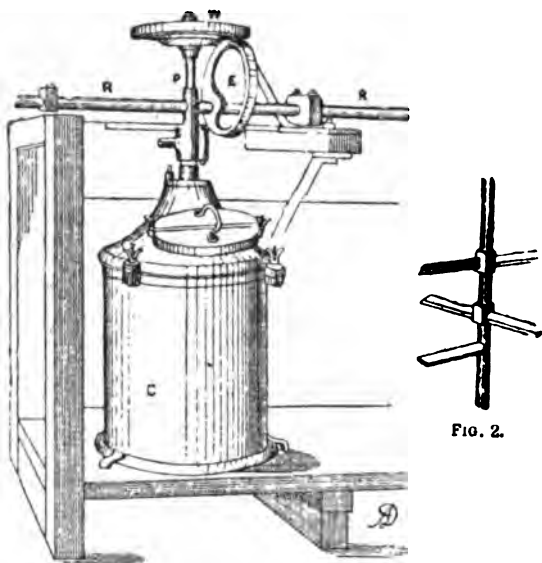


FIG. 2.

The fat is inserted in cylinder C, together with a certain amount of alcohol; there are usually four churns side by side attached to the same connecting rod R, which ends in a wheel connected with the steam engine by means of the usual band; the rod being thus set in rapid motion, the eccentric E lifts, depresses, and rotates the wheel W, which sets the piston P rotating, and alternately rising and falling at the same time. Fig. 2 shows the portion of the piston rod which is contained in the cylinder, and to which horizontal flanges are attached, and it will be readily seen that the churning process obtained by their rotating, at the same time that they rise and fall through the mass of fat and alcohol, is of a most efficient nature.—*Chem. and Drugg.*

Note on Suppositories.

WE reprint here some practical remarks on suppositories from a paper by F. A. Hocking and E. Brooke, read at a recent evening meeting of the School of Pharmacy Students' Association (after *Pharm. Journ.*.)

Suppositories are sometimes required of a size for which the ordinary 15-grain mould is unsuitable; in such cases recourse must be had to extemporaneous moulds, some ideas for which, suggested by various writers, may not be out of place here.

A piece of clay flattened out, and holes formed by a piece of wood conical at one end, forms a fairly good mould; but suppositories thus formed require trimming. Hard paraffin may be treated and used in the same manner. Paper fashioned into cones, and placed in sand or other convenient material, forms a very ready and convenient device. Lead foil may be substituted for paper with advantage. A small test tube, filed through at the bottom and embedded in sand, is another method, the suppository being expelled by a glass rod.

For making a hollow gelatin suppository the same method may be adopted as is used for gelatin capsules, which is as follows: A glass tube, with an oval bulb at one end, is dipped into the liquid gelatin mass, taken out, cooled, and the process repeated several times until a sufficient coating has been obtained. The suppository is released by sharply drawing a knife round the neck of the bulb and drawing off the coating; it may then be treated like a hollow cocoa-butter suppository.

A piece of glass tubing, with one end widened to form a funnel and the other end inserted in sand, forms a convenient bougie mould, from which the bougie may be expelled by a glass rod, and the end rounded by the fingers.

Other methods will doubtless suggest themselves to the mind of the ingenious pharmacist.

In the choice of a base, several requirements must be borne in mind. The suppository should melt at the temperature of the body, about 98° F., and at the same time it should be firm and rigid, so as to permit of its being handled without detriment to its shape. A minor but still important point must not be forgotten—namely, in regard to the time the base will remain without becoming rancid, and also its behavior towards active drugs with which it may be incorporated.

Aristol.

ACCORDING to Eichhoff, this is the voluminous reddish-brown, amorphous precipitate which occurs when an aqueous solution of iodine in iodide of potassium is treated with thymol dissolved in a solution of caustic soda. It is di-thymol-iodide, and contains about 45 to 46 per cent of iodine. It is said to be, like chrysarobin, an active but harmless remedy in psoriasis, mycosis, lupus, etc.

The *Chemist and Druggist* reports the following difficulties connected with its use: It seems that the iodine it contains has an irrepressible roving tendency, which leads it to seek independence and select combinations to its own taste from its surroundings. For this reason it decomposes with starch, and therefore cannot be employed in conjunction with the starch paste which is so favorite an application in skin diseases. It is also incompatible with all bodies which have a strong affinity for iodine, as caustic alkalies, carbonates of the alkalies, corrosive sublimate, metallic oxides, ammonia, etc. This, of course, restricts very considerably the use of the remedy, which can only be prescribed as a simple ointment with lanolin, in ethereal solution, or dissolved in oil.

Another exchange furnishes the following illustrative formulæ:

FOR PAINTING ON THE SKIN.

1. Aristol..... 1 part.
Flexible Collodion..... 9 parts.
- Mix, and dispense in a dark-colored bottle.
2. Aristol..... 1 part.
Olive Oil..... 2 parts.
Lanolin..... 7 parts.

Dissolve the aristol in the oil and mix with the lanolin. Aristol bougies, suppositories, pessaries, etc., are made with cocoa butter in the usual way.

Dr. Eichhoff (*Monats. f. prakt. Dermat.*, No. 2, 1890) believes the drug to be harmless, and preferable to iodoform so far as it is odorless. He finds it equal to iodoform in all cases in which he has tried it, excepting chancroid. It acts more slowly than chrysarobin or pyrogallol acid in cases of psoriasis, but has the advantage of not possessing the poisonous properties of the latter nor the disagreeable effects of the former. In parasitic skin diseases it is equal to other known remedies and is not irritating. In ulcers of the leg and in the ulcers of the tertiary stage of syphilis it causes more rapid healing than any other known external remedy, and he considers it to be superior to any other known external agent for the treatment of lupus. Dr. Eichhoff used a 10-per-cent ointment made with a petrolate.—*Br. Med. Jour.*, May 24th.

Paracresotinate of Soda.

PARACRESOTINATE of soda, a new antipyretic, is a fine, crystalline powder and has a bitter although not unpleasant taste. It is soluble in 24 parts of hot water, and is not precipitated when the water becomes cold. According to the *Journal de Médecine*, March 23d, 1890, doses of 48 to 60 grains produce no ill effects upon healthy animals. Free perspiration is usually caused by it, but otherwise no effect upon the digestive functions or upon the temperament is noted. In about half an hour after its administration the urine will assume a violet hue, due to the action of chloride of iron, which may be traced in the urine for thirty hours. Paracresotinate of soda has been used in various febrile diseases incident to childhood, and in every case the drug proved itself of unquestionable value as a reliable antipyretic. Its action was especially beneficial in cases of acute gastro-intestinal catarrh occurring in very young children. The following formula is recommended:

- B Paracresotinate of Soda..... 15 to 30 grains.
- Laudanum..... 2 to 4 drops.
- Cognac..... 16 minims.
- Simple Syrup..... 1½ fluidrachms.
- Distilled Water..... 7 fluidrachms.

Mix, and give one teaspoonful every two hours.

As an antipyretic, 15-grain doses given three times, one hour apart (for a child of 12), would cause a fall of temperature of 2° to 2½° Fahrenheit within two to four hours.—*Med. and Surg. Rep.*, June 7th, 1890.

Dr. Warburg in Poverty and Distress.—The *Chemist and Druggist* of June 14th brings a communication from Mr. Sydney Holland, of 44 Bryanston Square, W., London, informing the readers of the journal that Dr. Warburg, so well known to the professions of medicine and pharmacy, is living in great poverty. He is at present eighty-six years old, and has two widowed daughters, each with children, to support. The writer accidentally met one of these daughters and found her almost starving, her children ill, and the father quite unable to help her, owing to his own poverty. Dr. Warburg received £200 from the government in 1882 in recognition of the great value of his invention (Warburg's tincture), but this has been used up. Mr. Holland has so far collected £100 for his use, but would like to bring it up to such a sum that he can pay him and his family about 20 shillings per week. After his death the remainder is to be left to his children. It is hoped the laudable object will be accomplished.

Peptones of Meat.

MEAT that has gone through the process of complete peptonization is now recognized as a valuable agent in cases of weakness and debilitated digestion. The value of such a preparation depends, of course, upon the presence of well-defined bodies, chief of which are peptone, albumose, and gelatin, along with other soluble and predigested albuminoids. A method which has for its object the determination of the amount of these constituents has recently been communicated to the *Revue Internationale des Falsifications*, part x., p. 169, by M. Alphonse Denaeyer. The difficulty hitherto, it appears, has been to isolate the gelatin-chondrin, as the author calls it. The albuminoids are more or less closely allied, and but few reagents precipitate one apart from the other. The separation, however, may now be brought about, so the author claims, easily and with comparative rapidity by adopting the following briefly sketched plan. First, precipitation of the peptone of meat with the double iodide of mercury and potassium, which throws down only the albumose; the filtrate after concentration is then treated with excess of saturated solution of ammonium sulphate, and the mixture gradually brought to boiling heat. This results in the coagulation of the gelatin upon the walls of the vessel containing it. Rapid washing with cold water removes the small quantity of entangled iodide, but still leaves a little sulphate. It is then dried and weighed, and subsequently dissolved in hot water, and the ammonium sulphate determined by means of standard barium chloride (normal) and deducted from the first weight found. This is apparently the novel feature of the method. Second, precipitation with saturated ammonium sulphate, which gives albumose and gelatin. Both are thrown upon a tared filter, washed with the sulphate, dried, and weighed. The adhering sulphate is determined as in the first case, and deducted. Third, preliminary treatment with 95% alcohol to take up kreatin, kreatinin, urea, sarcosolactic acid, etc., the amount of which may be got at by filtering the alcohol, evaporating, and weighing the residue. The portion insoluble in spirit is dissolved in water and precipitated with phosphotungstic acid, which throws down albumose, peptone, and gelatin. These are dried and weighed on a tared filter; the ash is afterwards determined and the weight deducted. As will be seen at a glance from these data, the amount of each constituent may be readily calculated. Practice will show how far the method may be depended upon; it certainly appears to be convenient in operation, and the author has obtained results agreeing closely with those obtained from the estimation of the nitrogen. Appended are some of the results obtained, which give also an idea of the relative composition of different commercial preparations.

Designation.	Peptone of purified meat albumen.	Peptone of egg albumen.	Peptone direct from meat.
Peptone.....	37.675	34.700	25.857
Albumose.....	31.300	53.350	15.964
Gelatin.....	None.	None.	9.826
Definite compounds.....	5.525	5.930	29.972
Mineral salts.....	8.285	1.025	18.386
Water.....	10.350	4.625	None.
Insoluble.....	9.965	3.980	None.

—Lancet, May 31st.

The Cassis Trade in Burgundy.

By the short name "cassis" they mean in France a pleasant sort of cordial made with black currants, which at first was considered to be possessed of remarkable medicinal properties, but is now used like curacao or anisette, and occasionally employed in pharmacy for disguising ill-tasting medicines. Somehow luxuriant Burgundy has secured almost a monopoly of the cassis trade, with Dijon as its headquarters. In 1841 there was but one firm there, with the appropriate name of Lagoutte, which, starting with the output of a hundred gallons, turned out three years later six thousand gallons. Such success attracted competitors by the score. In 1860 there were 29 firms, with an aggregate production of 75,000 gallons, and last year Dijon alone had 34 cordial manufacturing firms, estimated to place on the market one million gallons a year. The price of the berry, of which about 40 ounces go to the gallon of cordial, has considerably varied since 1841. It was at first 3s. a hundredweight, gradually rose to 30s. in 1858, and is now worth 12s. to 15s. Nowadays they use the fresh berry almost altogether, and jealously guard the secret of their formulæ. But some old Burgundian recipes, of the time when cassis was a medicine, are not without interest, and no doubt would yield a first-rate cordial, if a little expensive. They made two sorts, the red and the green, according to the following formulæ:

RED CASSIS.

Black Currants (withered on the bush).....	1 pint.
Brandy.....	4 pints.
Sugar.....	2 pounds.
Water or Wine.....	2 pints.

Infuse the berries in the brandy, press out the marc, add the syrup, set aside for a while, and filter.

GREEN CASSIS.

Fresh Black-Currant Leaves.....	6 ounces.
Rectified Wine-Alcohol.....	35 "
Water.....	35 "
Sugar.....	35 "
Orange-flower Water.....	1 ounce.

Macerate the leaves in the alcohol, press out the liquor, and wash the leaves with one-half of the water; with the other half make a syrup, add it and the orange-flower water to the tincture, and filter.

For the green cordial it is unfortunate that in some countries black-currant leaves should have a bad smell, and in others no smell at all. The berries, on the contrary, while not being everywhere equally fragrant, generally make a pleasant cordial.

Capsules for Treatment of Gonorrhœa.

In the *Medical News* for June 14th, Dr. J. W. White, of the University of Pennsylvania, recommends the use of the following mixture, in capsules, for treatment of acute urethritis. In about two-thirds of his cases the discharge ceased within a week. In the majority it was necessary also to use an injection, and for this he recommends 2 to 10 grains of sulpho-carbolate of zinc in a 10 to 15-per-cent solution of peroxide of hydrogen.

Salol.....	3½ grains.
Oleoresin of Cubebs.....	5 "
Balsam of Copaiba (Para).....	10 "
Pepsin.....	1 grain.

The Salts of Hypoiodous Acid.

KNOWING, as we do, that iodine is able to displace chlorine from chlorates, forming the more stable iodates, we should naturally expect that the iodine compounds containing a relatively smaller proportion of oxygen would still, to some extent at least, exhibit a greater stability than the corresponding chlorine compounds.

The hypochlorites are very unstable, but are still capable of practical use, and therefore we might very reasonably expect that the hypoiodites would be sufficiently stable for preservation and use. Experience shows this to be the case. The hypoiodites which I have prepared and examined as being useful in medicine are those of calcium, potassium, and sodium.

The solution of calcium hypoiodite, which is analogous to a solution of the chlorine compound commonly known as bleaching lime, has been in use for some little time now under the name of "Liquor calcis iodinatæ." It is an excellent and almost tasteless preparation for internal administration. It is much superior to the tincture of iodine, when it is desired to administer free iodine, because the iodine is not set free until it reaches the acid stomach, and thus the action of iodine on the mouth and throat is avoided. Wishing to obtain a stronger solution for antiseptic purposes, I have recently been examining the hypoiodites of potassium and sodium. These, like the analogous hypochlorites, are obtained only in conjunction with the iodides in equal molecules (KI + KOI), etc.

The potassium hypoiodite (Liquor potassæ iodinatæ) affords a most useful antiseptic and parasiticide solution. Each ounce of this solution contains about 28 grains of iodine, in the form of hypoiodite of potassium, which is at once decomposed, yielding free iodine, by any dilute acid. This liquid, containing so large a proportion of iodine in so loosely combined a form, is obviously a most powerful antiseptic. The ease with which it gives up its iodine is shown by the fact that the acidity of paper or calico is often enough to set free iodine, which colors the starch present. Acidity of the skin in some cases has a similar effect.

Liquor potassæ iodinatæ can be applied undiluted to the unbroken skin, but causes smarting, unless diluted, when applied to a raw surface. Liq. potassæ iodinatæ can also be given internally in small doses (5 or 10 minims) diluted.

The hypoiodites, when shaken up with olive oil, form soaps, propenyl hypoiodite [C₃H₅(OI)] being probably formed instead of propenyl alcohol or glycerin [C₃H₅(OH)], as happens when fats are saponified by the caustic alkalis.

The soapy liniment formed by shaking together equal parts of Liquor potassæ iodinatæ and olive oil is a much better preparation than the "Linimentum potassii iodidi cum sapone," B. P., since it contains iodine in a much more active form. A dilute acid added to this liniment sets free the iodine.—HUGH WOODS, M.D., in *Br. Med. Journ.*

Compound Belladonna Liniment.

DR. JOHN C. BERRY recommends in the *Medical Record* of June 14th, 1890, the employment of the following liniment for the relief of pain in rheumatic affections.

It is composed of liniment of belladonna, 7 parts, and 1 part of chloroform of belladonna. The British formulæ for the above are:

Belladonna Liniment.—Percolate 20 ounces of powdered belladonna root with rectified spirit, dissolving in the percolate 1 ounce of camphor, and obtaining 30 ounces of liniment.

Chloroform of Belladonna.—Twenty ounces of bruised belladonna root are macerated with 1½ ounces of strong solution of ammonia and 20 ounces of distilled water (previously mixed) for four hours; dry, and reduce to No. 40 powder. Macerate for twenty-four hours in 20 ounces of chloroform in a percolator provided with a tap, then percolate slowly, adding more chloroform until 30 ounces are obtained.

The method of application is to dilute this compound with 1 to 2 parts of pure chloroform and apply by sprinkling it on spongio-piline wrung out of hot water. This is then applied firmly to the affected joint for five minutes and followed with cotton and oiled silk.

Tasteless Fluid Extract of Cascara Sagrada.

	Parts.
Cascara Sagrada, in No. 40 powder.....	100
Magnesia, calcined.....	1
Alcohol.....	100
Water.....	q. s. 100

Mix the alcohol and water in the proportions of 2 parts of alcohol to 3 parts of water, and moisten the mixed powder thoroughly with the menstruum, then let it stand until the bitterness has disappeared, and pack in a cylindrical percolator, not too firmly, and pour on the menstruum. When the liquid begins to drop from the percolator, close the lower orifice and proceed according to the U. S. Pharmacopœia method of preparing fluid extracts.

This extract carefully prepared has, according to Mr. H. M. Beck, a pleasant taste, and is quite as active as the bitter fluid extract. Mr. Beck states that the tonic property of the bitter extract may be destroyed by the magnesia, but this can be remedied by combining it with some substance having tonic properties, such as nuxvomica or cinchona. The organic constituents of tasteless extract are volatile and fixed oils, a yellow crystalline and sublimable substance, glucose, brown coloring matter, yellow, red, and brown resins, tannin, and a second crystalline substance.—[*Proceed. Calif. Pharm. Soc. Chem. and Drugg.*]

The Therapeutic Uses and Toxic Effects of Cannabis Indica.

A VALUABLE contribution to the literature of Indian hemp is a paper with this title, published in the *Lancet* for March 22d, 1890, by Dr. J. Russell Reynolds. In explaining the occasional toxic effects of this drug, two things must be remembered: First, that, by its nature and the forms of its administration, Cannabis indica is subject to great variations in strength. Extracts and tinctures cannot be made uniform, because the hemp grown at different seasons and in different places varies in the amount of the active therapeutic principle. It should always be obtained from the same source, and the minimum dose should be given at first and gradually and cautiously increased. The second important fact to keep in view is that individuals differ widely in their relations to various medicines and articles of diet—perhaps to none more than to substances of vegetable origin, such as tea, coffee, ipecacuanha, digitalis, nuxvomica, and the like. In addition to the purity of the drug, the possibility of idiosyncrasy must be borne in mind as calling for caution in giving Indian hemp. By gradually increasing the dose and habituating the organism to its use, the use of Cannabis indica may be pushed to 3 or 4 grains at a dose with positive advantage. But in Dr. Reynolds' experience a grain would bring about toxic effects in the majority of healthy adults; and a quarter of a grain has done the same, but never a fifth, which is the proper amount with which to begin the use of the drug among grown persons, a tenth of a grain being the proper initial dose for children. The best preparation for administration is the tincture—1 grain to 20 or 10 minims—dropped on sugar or bread. The minimum dose should be given, as before stated, repeated every four or six hours, and gradually increased every third or fourth day, until either relief is obtained or the drug is proved useless. With such precautions, Dr. Reynolds states he has never met with toxic effects and rarely failed to ascertain in a short space of time the value or uselessness of the drug.

Its most important results are to be found in the mental sphere, as, for instance, in senile insomnia with wandering. An elderly person (perhaps with brain softening) is fidgety at night, goes to bed, gets up, thinks he has some appointment to keep, that he must dress and go out.

Day, with its stimuli and real occupations, finds him quite rational again. Nothing can compare in utility to a moderate dose of Indian hemp at bedtime—a quarter to a third of a grain of the extract. In alcoholic subjects it is uncertain and rarely useful. In melancholia it is sometimes serviceable in converting depression into exaltation; but, unless the case has merged into senile degeneration, Dr. Reynolds does not now employ Cannabis indica. It is worse than useless in any form of mania. In the occasional night restlessness of general paretics and of sufferers from the "temper disease" of Marshall Hall, whether children or adults, it has proved eminently useful.

In painful affections, such as neuralgia, neuritis, and migraine, Dr. Reynolds considers hemp by far the most useful of drugs, even when the disease is of years' duration. In neuritis the remedy is useful only in conjunction with other treatment, and is a most valuable adjunct to mercury, iodine, or other drugs, as it is in neuralgia when given with arsenic, quinine, or iron, if either is required. Many victims of diabolical migraine have for years kept their sufferings in abeyance by taking hemp at the threatening or onset of the attack. In sciatica, myodynia, gastrodynia, enteralgia, tinnitus aurium, muscæ volitantes, and every kind of so-called hysterical pain, Cannabis indica is without value. On the other hand, it relieves the lightning pains of ataxia, and also the multi-form miseries of the gouty, such as tingling, formication, numbness, and other paræsthesiæ.

In clonic spasm, whether epileptoid or choreic, hemp is of great service. In the eclampsia of children or adults, from worms, teething (the first, second, or third dentition), it gives relief by itself in many cases. Many cases of so-called epilepsy in adults—epileptoid convulsions, due often to gross organic nerve-centre lesions—are greatly helped by Cannabis indica when they are not affected by the bromides or other drugs. Take, for instance, violent convulsions in an overfed man, who is attacked during sleep, a few hours after a hearty supper, the attacks recurring two or three times an hour for a day or two, in spite of "clearing the primæ viæ" or using bromine or some other classic drug. These attacks may be stopped at once with a full dose of hemp. In brain tumors or other maladies in the course of which epileptoid seizures occur, followed by coma, the coma being followed by delirium—first quiet, then violent—the delirium time after time passing into convulsions, and the whole gamut being repeated, Indian hemp will at once cut short such abnormal activities, even when all other treatment has failed. In genuine epilepsy it is of no avail. In cases where it has seemed to do good, the author doubts the correctness of the diagnosis and suspects organic lesion or eccentric irritation. In tonic spasms—such as torticollis and writer's cramp—in general chorea, in paralysis agitans, in trismus, tetanus, and the jerky movements of spinal sclerosis, Cannabis indica has proved absolutely useless. At the same time it is most valuable in the nocturnal cramps of gouty or old persons, in some cases of spasmodic asthma, and in simple spasmodic dysmenorrhœa. Thus it will be perceived that for the relief of suffering, quite apart from a curative effect, hemp must ever be held in high esteem and ranked with the poppy and with mandragora.—*N. Y. Med. Jour.*, June 7th, 1890.

Two Methods for the Direct Determination of Chlorine in Mixtures of Alkaline Chlorides and Iodides.

FROM a paper on this subject by F. A. Gooch and F. W. Mar (in *Chem. News*, May 30th), we take the following summary, referring for details to the original:

First Method.—To the solution of the alkaline chloride and iodide diluted to about 400 C.c. in an Erlenmeyer flask capable of containing a liter, are added 10 C.c. of sulphuric acid of half strength with 2 Gm. of ferric sulphate (either in the form of iron alum, or ferrous sulphate oxidized in concentrated solution by about 0.3 C.c. of nitric acid) and 3 C.c. of nitric acid. A trap (allowing gas to escape, but preventing air from entering) is hung in the neck of the flask, and the liquid is boiled until the steam which escapes no longer gives to red litmus paper, after two minutes' exposure, the characteristic gray-blue due to traces of iodine. Then 1 C.c. more of nitric acid is added, and the test for iodine again made. When no iodine is found in the escaping vapor, silver nitrate is added in excess to the contents of the flask, the precipitate is settled, collected in a perforated crucible on asbestos, dried, and weighed as silver chloride.

Second Method.—The solution of the chloride and iodide contained in an Erlenmeyer flask is diluted to 400 C.c.; 10 C.c. of sulphuric acid of half-strength are added, and the vapor from 2 Gm. of sodium nitrite acted upon by dilute sulphuric acid (preferably in a simple generator) is passed with reasonable rapidity into the agitated solution. The liquid is boiled until colorless, and still further until litmus paper placed in the steam gives no reaction for iodine after an exposure of two minutes. The contents of the flask are treated with silver nitrate, and the precipitated chloride is treated exactly as in the first method.

Both methods are convenient and precise.

Preparation of Very Active Platinum Black.

THE catalytic action of platinum black differs considerably with the method employed for preparing the metal in this peculiar form, the product obtained by decomposing a hot solution of platinic sulphate with alcohol exhibiting this property in a greater degree than that prepared by boiling a solution of platinic chloride with sodium carbonate and sugar, or by precipitating the metal with zinc and hydrochloric acid. The author had occasion to require a very powerful catalytic agent, and after making a number of experiments succeeded in obtaining a suitable product by proceeding in the following manner: 50 Gm. of platinic chloride in 50 to 60 C.c. of water are mixed with 70 C.c. of 40 to 45 per cent formaldehyde, and treated gradually and with constant cooling with 50 Gm. of caustic soda in 50 C.c. of water. After standing for twelve hours the mixture is filtered and the precipitate washed. The filtrate, which at first has a yellow color, assumes a black color as soon as the greater portion of the salts (sodium chloride and sodium formate) has been removed. This is due to the fact that part of the precipitate dissolves in water at this stage; if, however, the black mass is allowed to drain on the filter, it rapidly undergoes oxidation and becomes insoluble, after which the washing can be completed without further loss. The precipitate is then pressed and dried over sulphuric acid.—O. LOEW, *J. Soc. Chem. Ind.* (Abstract).

Medicinal Gelatins.

THESE preparations are indicated in superficial inflammatory affections when the skin is swollen, wet, and itchy. Very high temperature and profuse sweating forbid their use. For a general basis the following formula is given—the first series of figures gives a firmer consistence:

	Parts.	Parts.
B Zinc Oxide	15	10
Gelatin.....	15	30
Glycerin.....	25	30
Water.....	45	30

1. Cerussa, iodide of lead, white precipitate, sulphur, iodoform, chrysarobin in fine powder, may be mixed in any proportion required. From 5 to 10 per cent added to soft zinc gelatin is recommended.
 2. Carbolic and salicylic acids, resorcin, naphthol, creosote, and sulphide of potassium may be added to the hard gelatin basis in any proportion up to 10 per cent.
 3. Fats, balsams, tars, and ichthyol all make the basis softer. The proportion added is usually from 10 to 20 per cent.
 4. If we wish to combine drugs in rules two and three, then the sum of the proportions must be attended to. For example, if resorcin and salicylic acid were both ordered we should not prescribe more than 5 per cent of each if we wish the gelatin to form a good covering.
 5. Powders may be combined in any proportions.
 6. Tannin, pyrogallol, and oxide of mercury cannot be added to the basis.
 7. Corrosive sublimate up to 3 per cent, camphor, chloral, and camphor-chloral all to 2 per cent, ext. Cannabis indica from 2 to 5 per cent, may be used with soft zinc gelatin.
- The different glues should be dispensed in pots, which are to be put in boiling water when the preparation is to be used. It is to be painted on the skin with a long-haired brush.—*Deutsch. Med. Zeit.*

Physiological Action of the Active Principles of Jequirity.

KLEIN has shown that the poisonous properties of the seeds of *Abrus precatorius* (jequirity) cannot be due to a bacillus, and Warden and Waddell ("Non-Bacillar Nature of Abrus Poison," Calcutta, 1884) showed it to be due to the action of a poisonous proteid. The proteids in the seeds are two in number, a globulin and an albumose, and the present paper relates to the physiological action of the first of these. The proteids were obtained by extracting the crushed seeds with a 15-per-cent solution of sodium chloride; they were precipitated from this extract by saturation with ammonium sulphate; the precipitate was redissolved by adding water, and from this solution the globulin was precipitated by dialysis, collected, washed, and dried.

The actions ascribable to this globulin are the production of local oedema and inflammation when subcutaneously injected or applied to the eye, the presence *post mortem* of petechiæ beneath the serous membranes, and the occurrence of hæmorrhagic gastro-enteritis. It also produces a remarkable fall of body temperature after subcutaneous injection, and in lethal doses it causes rapidity of breathing shortly before death. It has little or no effect on blood pressure. The activity of this globulin is destroyed by heating the solution to 75° or 80°, the temperature at which it enters into the condition of a heat coagulum.—S. MARTIN and R. N. WOLFENDEN in *Proc. Roy. Soc.* (and *J. Chem. Soc.*).

Amending the Odor of Naphthalin.

YEARS ago we pointed out the peculiarity of naphthalin to assume a very distinctive and rather agreeable odor when intimately mixed with very small quantities of certain aromatics, such as essential oils.

Since then naphthalin has become an important article of commerce. It has largely replaced camphor for the extermination of moths, for use in urinals and other similar purposes. As a moth exterminator its own strong and disagreeable odor was much objected to, and it seems that combinations of it with certain odorous oils, though agreeable, had too penetrating an odor, at least for ward-robes. Mr. Rothe, of Ems, recently found that when a little camphor is melted together with naphthalin, the resulting compound acquires nearly altogether the odor of camphor, while it fully retains its moth-destroying properties.

Apparatus for Clinical Estimation of Urea.

C. W. HEATON and S. A. VASEY describe in the *Lancet* of May 10th a simple apparatus used by them in hospital work for estimation of urea. Its advantage is that it can be easily constructed, and that its maximum error of calculation is not so great as to render it unreliable. The essential apparatus are the usual pharmaceutical measures, a thistle funnel, about a foot of glass tubing, and two bottles with stoppers.

1. An 8-ounce bottle is fitted with a thistle funnel and bent glass delivery tube as though for the preparation of hydrogen, the lower end of the funnel tube being bent upward to prevent gas from entering. 2. A small basin or breakfast cup may be used as a pneumatic trough, a 4-ounce bottle being filled with water and inverted in it in such manner that the end of the gas-delivery tube can readily be brought under the mouth of the bottle. 3. A 40-per-cent solution of good commercial caustic soda may be prepared by dissolving one-half pound avoirdupois in water, and when cold adding water enough to make 1 pint (imperial).

Into the gas generator pour, by means of the funnel, 1 fluidrachm of bromine, washed in by 10 fluidrachms of the soda solution. The generator should then be immersed in cold water, and the inverted bottle of water be placed over the delivery tube. Two fluidrachms of urine (measured carefully) are added and washed in by exactly 1 fluidrachm of water. The 3 drachms so added will, of course, displace a corresponding amount of air in the receiving bottle. This is allowed for in subsequent calculation. The generator is to be gently shaken, and after effervescence has subsided the air and nitrogen in the receiving bottle will represent the nitrogen evolved by the reaction plus the 3 drachms of displaced air above referred to.

Keeping the generator at the temperature of the surrounding air, when the evolution of gas ceases the receiver is removed by first covering its orifice with the thumb or a slip of glass, and placed, mouth upward, on the table. After deducting 180 (which may be taken as 200) minims due to air displaced by the tube, each 100 minims of water required to fill the receiver represent 0.25 per cent of urea in the urine examined. If the urine contains more than 3 per cent of urea, it is best to dilute it with an equal volume of water before making the determination.

The following table gives the percentage of urea corresponding to the volume of gas liberated, as shown by the quantity of water required to fill the bottle:

Minims of Water Required.	Percentage of Urea.	Minims of Water Required.	Percentage of Urea.
200	0.00	900	1.75
300	0.25	1,000	2.00
400	0.50	1,100	2.25
500	0.75	1,200	2.50
600	1.00	1,300	2.75
700	1.25	1,400	3.00
800	1.50		

The Poisonous Constituent of Castor-Oil Seeds.

A DIASTATIC ferment called "*ricin*" is extracted from castor-oil seeds as follows: Fresh shelled seeds are ground to a powder and agitated with a 10-per-cent solution of sodium chloride. The solution is filtered, saturated at the ordinary temperature with magnesium sulphate and sodium sulphate at the same time, and then allowed to stand. Large crystals of the two sulphates separate out, and in addition a white amorphous precipitate which can be readily separated from the crystals and collected. This is the substance "*ricin*." It is purified by repeated dialysis at a low temperature, and then dried in vacuum over strong sulphuric acid. Thus prepared it forms a white, friable powder, free from taste and smell, and very poisonous. It still contains 10 to 20 per cent of sulphates. It loses its toxic properties when boiled, but keeps perfectly in the substance. A 10-per-cent solution of sodium chloride is the best solvent for it. It appears that similar poisonous albuminoid bodies exist in other species of *Ricinus*, and also in the seeds of *Croton Tiglium* and of *Jatropha Curcas*.—H. STILLMARK in *Pharm. Centralh.* and *J. Soc. Chem. Ind.*

Wood as a Source of Human Food.

In an address at Heidelberg by Victor Meyer, it is announced "that we may reasonably hope that chemistry will teach us to make the fibre of wood a source of human food." What an enormous stock of food, then, will be found, if this becomes possible, in the wood of our forests or even in grass and straw! The fibre of wood consists essentially of cellulose, $C_6H_{10}O_5$. Can this be made to change into starch? Starch has exactly the same percentage composition, but, as every one knows, it differs very much in its properties, and the nature of its molecule is probably much more complex. Cellulose is of little or no dietetic value, and it is not altered, like starch, in boiling water. It readily gives glucose when treated with strong sulphuric acid, as is easily shown when cotton wool, which is practically pure cellulose, is merely immersed in it. Starch gives the same product when boiled with weak acid. The author further quotes the researches of Hellriegel, which go to show beyond dispute that certain plants transform atmospheric nitrogen into albumen, and that this process can be improved by suitable treatment. The production, therefore, of starch from cellulose, together with the enforced increase of albumen in plants, would, he adds, in reality signify the abolition of the bread question. It must be borne in mind, however, that theory, fascinating and promising though it may be, is not always capable of being followed up by practical result.—*The Lancet*.

Sterilization of Water.

UNLESS extraordinarily resistant, water becomes sterilized if it be at or near the boiling temperature for fifteen minutes. If the same degree of heat be maintained for five minutes, all harmful micro-organisms will have been destroyed. Still less time serves to destroy the disease-producing varieties which are recognized as liable to occur in water. Thus merely raising to the boiling point a clear water containing the micro-organisms of malarial disorders, typhoid, cholera, diphtheria, or of suppurative processes, and allowing it to gradually cool, insures the destruction of these germs. They are also destroyed by keeping the water for from a quarter of an hour to half an hour at a temperature of $70^{\circ}C$.

Occasionally, however, very resistant but harmless bacteria may get into water. The brief heating renders them safe for drinking purposes; but when it is desired to destroy every micro-organism that may be present in a contaminated water, it should be heated for one hour and allowed to cool slowly. Then it may be used for cleansing wounds or for alkaloidal solutions, which will keep indefinitely if no germs be introduced after the solution has been heated.—CHAS. G. CURRIER, M.D., in *Med. Record*, June 14th, 1890.

Oil of Bitter Almonds.

THE difficulty of obtaining genuine, pure oil of bitter almonds has become so great that the well-known house of Schimmel & Co. have felt compelled to draw special attention to this matter in one of their recent reports. In most cases the artificial oil, worth 50 cents per pound, is simply substituted for the natural oil, which is worth from \$3.50 to \$4.50. Mixtures of the two kinds are seldom found in the market. The firm especially warns against the French oil, which they invariably found to be the artificial. In 1870 a Paris firm hit upon the idea to add a certain portion of hydrocyanic acid to this, so as to make it the more readily pass for the genuine oil.

In attempting to distinguish the true from the artificial oil, the boiling point and specific gravity are no reliable criteria. The only reliable method is to examine the oil for traces of chlorine. Since the artificial oil is prepared from benzyl chloride, and traces of chlorinated products obstinately adhere to the artificial oil of almonds prepared therefrom, it is only necessary to search for these. The following method is recommended by Schimmel & Co.:

Into a small porcelain capsule, standing upon a plate, is placed a piece of folded blotting paper saturated with the oil to be tested. This is set on fire and the capsule then immediately covered with a half-gallon beaker, the inner walls of which had previously been wetted with distilled water. The gases arising from the combustion, coming in contact with the moisture, are thus dissolved. The beaker is then washed out with a little distilled water, and this liquid, when tested in the usual manner with nitrate of silver, should give neither a white precipitate nor even a cloudiness.

The test for prussic acid, as used by Schimmel & Co., is as follows:

Agitate 10 to 15 drops of the oil with 2 or 3 drops of a 30-per-cent solution of soda. Next add a few drops of a solution of slightly oxidized ferrous sulphate and shake vigorously. Then acidify with dilute hydrochloric acid. This will dissolve all precipitated matter except the Prussian blue which had formed in the reaction.

Diabetic Diet.

PROF. NAUNYN, of Strassburg, gives the following rules for the diet of a diabetic person. These rules will be of much practical benefit to those who cannot always consult their physician:

A. *Food*.—Meat of every kind and form, prepared without starch or sugar. Also sweetbreads and calves' brains. Daily meat ration, 1 to $1\frac{1}{2}$ pounds, weighed cooked. In place of meat, eggs may be used as desired. One egg is equivalent to about 2 ounces of meat; the yolk of the egg contains even more nitrogen than meat. Fat may be used in every form. Bread, if at all permitted, may be used to the extent of 1 to 3 ounces per day. Vegetables and fruits are valuable for the organism, since they supply the salts of the alkalies and alkaline earths; but the carbohydrates contained therein render their use advisable only in cases where it is found that they are comparatively harmless. The dextrogyre carbohydrates, viz., glucose, starch, and dextrin, are badly digested by diabetics; but the lævogyres, viz., levulose, inulin (the starch of the *Compositæ*), inositol, and mannite, are easily and almost completely digested without increasing the sugar. Hence, while the former are dangerous, the latter are harmless. Among vegetables the following are to be recommended: Jerusalem artichoke (*Topinambour*, from *Helianthus tuberosus*), Chinese or Japanese stachytubers (contain much inulin), chicory root, dandelion root, common artichokes, green peas, mushrooms (contain mannite), apples and pears (contain levulose).

B. *Drink*.—Milk, particularly sour milk (buttermilk), kefir, or kumys, 1 to $1\frac{1}{2}$ pints, may be used daily, if it is found that the ingestion of milk-sugar is without influence upon the excretion of glucose. (In some patients this is the case, in others not.) Light wines, claret, brandy or whiskey [schnapps] with water are permitted; of the heavier wines, dry sherry. Beers are dangerous. Bitter liquors are permitted; but sweet ones must be avoided. Cocoa is forbidden; but tea or coffee (without sugar) is allowed.—*Med. Chir. Rundschau*.

Dose of Tincture of Nux Vomica.

MR. JONATHAN HUTCHINSON (*Archives of Surgery*, January, 1890, p. 280) says he has for many years prescribed the tincture of nux vomica very freely indeed. He thinks it the best of all tonics, for it very rarely disagrees, and he has never known it to produce poisonous effects. He generally gives 10 minims three times a day to an adult, but often double that dose. He has given 5 minim doses to a child of ten, and has, for experiment, taken himself a single dose of 30 drops and realized no symptoms of strychnia poisoning whatever.

He believes the tincture of nux vomica to be a safer and more convenient form than any of the solutions of strychnia, and it has also the advantage of not exciting alarm in the patient. He says it may be taken for months together, and does not diminish in efficiency. Mr. Hutchinson has had many patients who have taken more than was intended and yet never so far with any serious ill result.

He relates two cases. A gentleman, 33 years old, took by mistake five consecutive doses of 40 minims three times a day instead of 10 minims during the same time as ordered. The only ill result was that the head had been made to feel dull and the eyes heavy, as if he had been drunk over-night. There was no muscular twitching.

In the second case the patient took 40-minim doses of the nux vomica tincture. He continued it three times a day for four doses in succession. The symptoms were exactly as in the other case—a dull feeling in the head, but no twitchings. He felt "wonderfully better for it."

Volumetric Estimation of Tannin in Wines.

A TEN-PER-CENT solution of tartaric acid is made very slightly alkaline by the addition of ammonia, and to this is added a neutral lead acetate solution until the precipitate which first forms just ceases to be redissolved. After being filtered, the solution is ready for use. This solution completely precipitates tannin from its solutions. It is standardized by means of a solution of pure tannin as follows: 25 C.c. of a tannin solution of 5 Gm. per liter are placed in a flask with 4 or 5 drops of ammonia. The lead aceto-tartrate solution is run in, a couple of cubic centimeters at a time, from a burette. After each addition a drop of the solution is placed on a double filter paper, the upper one of which retains any precipitate that may have been conveyed by the drop, while a drop of sodium sulphide is brought into contact with the liquid in the lower paper. A brown stain, due to excess of lead, only appears after the tannin is completely precipitated. After a preliminary estimation, the titration is more accurately made by adding a few drops at a time of the lead solution, when near the end of the process. The estimation of tannin in wine is made in precisely the same manner. The method is very rapid, and gives very satisfactory results.—L. ROOS, CUSSON and GIRAUD, *Journ. de Pharm. and J. Chem. Soc.*

A New Indicator for Acids and Alkalies.

A NEW indicator has been recently proposed by R. Zaloziecki (in *Chem. Zeit.*). It is a substance described a short time ago by Doeberner, and known as *alpha-naphthol-benzoin*. It is prepared by adding 2 molecules of *alpha-naphthol* and 1 molecule of benzol trichloride to some benzol contained in a flask (the benzol acts as a diluent, to diminish the energy of the reaction), and allowing it to stand for twenty-four hours. The flask is then warmed to 30° to 40° C., and the benzol and excess of benzol trichloride distilled off by means of a current of steam. The resulting colored mass is purified by solution in soda and fractional precipitation with hydrochloric acid. This is repeated several times, and the pure coloring matter finally washed with water. When pure and dry, it constitutes a reddish-brown powder. Traces of alkalies dissolve this with a strong green color; dilute acids change this to reddish yellow. The change from the latter to green is more sharply seen. Hence it is best to use the reagent when titrating with acids. The indicator belongs to the same class as phenolphthalein. It is exceedingly sensitive to carbonic acid, which affects it almost like a mineral acid.

On the Most Suitable Strength of Reagents.

R. BLOHMANN suggests that in order to introduce some uniformity into the strength of laboratory reagents, the solutions should have a relation to the molecular weight of the substance dissolved, and has drawn up tables giving a convenient strength whilst keeping to the principle of equivalent weights. The following series are made up so as to be of *twice the normal strength*: Hydrochloric acid, nitric acid, sulphuric acid, acetic acid, oxalic acid, tartaric acid, caustic potash and soda, and ammonia, ammonium sulphide, chloride, and carbonate, sodium carbonate and acetate. The following are recommended to be of *normal strength*: Barium, calcium, and ferric chloride, potassium, magnesium, and copper sulphate, sodium phosphate, lead acetate, potassium chromate, and potassium ferrocyanide. *Half normal* solutions are to be made with platinic and mercuric chloride, silver and barium nitrate. Reagents used for oxidation and reduction are to be *normal*, i.e., equivalent to 8 Gm. of oxygen in the liter. Such substances which do not readily dissolve in water are to be used in saturated solutions.—Abstract from *Berichte*, 1890, 23.

New General Reaction for Nitrogen in Organic Substances.

PROF. E. DONATH communicates to the *Chemiker Zeitung* an important new reaction for nitrogen which is of great practical value, especially for preliminary research. We reprint a portion of the paper here (after *Chem. News*):

The experiments which the author has performed with a number of substances belonging to the most different groups have almost completely confirmed his supposition that when organic substances are reduced by energetic oxidation in an alkaline solution, the nitrogen appears as nitrous acid. The substances named below were introduced into small flasks in quantities of from 0.03 to 0.05 Gm. (according to the proportion of nitrogen) with 0.5 to 1 Gm. powdered permanganate, and from 15 to 20 C.c. of potassa lye, perfectly saturated at the ordinary temperature, were added and heated to a boil, adding, if needful, more permanganate until, on further boiling, the liquid remained violet or greenish blue.

The flask was then allowed to cool, the liquid moderately diluted with water, which occasions heating; the excess of permanganate is reduced by the addition of a few drops of pure alcohol, and the manganese hydroxide is filtered off. The filtrate is then tested [for nitrous acid] by the admixture of freshly prepared solution of potassium iodide and acidulation with hydrochloric acid, by means of carbon disulphide or zinc iodide and starch.

In addition, the filtrates were tested for oxyacids in general by means of diphenylamine in a sulphuric solution, and for nitric acid in particular by brucine and concentrated sulphuric acid. These experiments showed that in all the substances examined the reactions for nitric acid were produced with the greatest distinctness, but that the brucine and sulphuric acid reaction for nitric acid did not succeed in all cases. In the case of coal, potassium ferrocyanide, and all bodies of the aromatic group, the reaction was more difficult and tedious.

The bodies examined were:

Urea, albumin, potassium ferrocyanide, amygdalin, indigotin, coal, pepsin, quinine sulphate, magenta, binitrobenzol, tropæoline, betaine hydrochlorate, asparagin, ammonium sulphate, casein, "Biebrich scarlet," binitro-naphthalin, naphthylamine, nitrosonaphthol, and nitrosotoluol.

As these bodies belong to nearly all the most important groups of organic bodies, the conclusion is justified that the above-described oxidation with permanganate and strong potassa-lye, and the consequent formation of nitrous acid, is a new universal reaction for nitrogen in organic compounds.

Testing Oil of Cinnamon.

SINCE the quality and value of oil of cinnamon depend entirely upon the amount of cinnamic aldehyde it contains, Schimmel & Co. recommend the following method for determining it:

Mix 75 Gm. of the oil in a good-sized flask with 300 Gm. of a boiling solution of bisulphite of sodium containing 30 per cent of the salt. The acid sulphite combination with the aldehyde ($C_6H_5.CH.CH.CO.HNa.SO_3$) separates in the form of a gelatinous precipitate. Shake this vigorously and allow it to stand a short time. If heat is developed during the reaction, which happens if the oil is rich in aldehyde, cool the flask by the affusion of cold water. Now add about 200 Gm. of hot water and warm the mixture on a water-bath, frequently shaking, until the compound formed is entirely dissolved and the non-aldehydes float on top of the solution of the aldehyde salt in form of an oily layer. Allow the mixture to become cold, and shake it first with about 200 C.c. and then with 100 C.c. of ether. Separate the ethereal solution of the non-aldehydes, and filter it into a previously tared and good-sized beaker into which a spiral-shaped platinum wire is placed. Evaporate the ether as rapidly as possible by immersing the beaker in hot water. As soon as the liquid ceases to foam or boil up when shaken around, allow it to cool, and weigh. Then place the beaker again into hot water for ten minutes, cool, and weigh again. Continue this until the difference between the last two weighings does not exceed 0.3 Gm. Take the weight next to the last as the correct weight. This weight, deducted from the original weight of the oil, gives the amount of cinnamic aldehyde present.

Schimmel & Co. say that the method of expelling the ether has a great influence upon the accuracy of the result. The non-aldehydes, though volatilized with difficulty, are nevertheless volatile. The ether must therefore be boiled off rapidly, and the beaker must not be allowed to stand in the water-bath longer than is necessary for the evaporation of the ether.

Detection of Carbonic Oxide in the Blood.

ZINC chloride or very dilute platinic chloride solutions produce a bright-red coloration with carbonic-oxide-hæmoglobin, whilst normal blood is colored brown or very dark brown. If the blood is diluted with water, the precipitated hæmatin and albumin are colored. Carbonic oxide blood after standing in cold water for two minutes becomes raspberry-colored, oxyhæmoglobin grayish brown. Twenty-five per cent of carbonic oxide blood was detected by this means. Phosphomolybdic acid or 5 per cent phenol produces a carmine-colored precipitate with carbonic oxide blood, a reddish-brown one with oxyhæmoglobin; 16 per cent of the former can be detected by this reaction. If 15 C.c. of 20-per-cent potassium ferrocyanide solution in 2 C.c. of dilute acetic acid are added to 10 C.c. of carbonic oxide blood, an intense, bright-red coloration is produced; normal blood becomes dark-brown colored with this treatment. If 4 parts of normal blood are diluted with 4 parts of water and shaken with 3 volumes of a 1-per-cent tannin solution, it becomes colored primarily bright red with a yellowish tinge; at the end of one to two hours it has become brownish, and finally has turned gray at the end of twenty-four hours; carbonic oxide blood treated in the same manner is also colored bright red at first, with a bluish tinge, which color, however, remains unchanged. Both of these reactions were observable with 1 per cent carbonic oxide blood in 1 per cent hæmoglobin, and carbonic oxide was detected in air by its means when present to the extent of 0.0023 per cent. Phenylhydrazin produces a bright-red coloration with blood containing carbonic oxide, and a dark-red coloration changing to black with normal blood; the blood is diluted to 1 in 40 for this reaction. If more than 5 drops of the phenylhydrazin solution are added, a grayish-violet coloration is obtained with oxyhæmoglobin, and a rose-red color with carbonic oxide blood. A rabbit died when its blood was three-fourths saturated with carbonic oxide.—A. WELZEL, in *Chem. Centr. and Journ. Chem. Soc.*

Ten C.c. of the blood diluted to one-fiftieth are added to 0.2 C.c. of deep yellow ammonium sulphide and 0.2-0.3 C.c. of a 30-per-cent acetic acid, and carefully mixed. The liquid should then react slightly acid. Blood containing carbon monoxide takes a fine rose color, whilst normal blood is greenish-gray or reddish-greenish-gray. The ammonium sulphide is obtained by adding 2.5 Gm. of pure pulverized sulphur to 100 Gm. of freshly prepared, colorless ammonium sulphide.—K. KATAYANA, in *Virch. Arch. and Chem. News*.

Oil of Wintergreen.—Schimmel & Co. state that the synthetic oil of their manufacture, which is distilled with steam, always contains traces of water, which accounts for the fact that the specific gravity is liable to variations in the third decimal place. The spec. grav. of the oil, when entirely free from water, is 1.1870 at 15° C., and its boiling point 219°-221° C., the thermometer being entirely immersed in the vapor.

The Effect of Antipyrin on the Solubility of Caffeine.

TANRET has shown that in adding to caffeine nearly its own weight of salicylate or benzoate of sodium the solubility of caffeine in water is greatly increased. In the *Répertoire de Pharmacie* for February 10th, 1890, attention is called to the fact that antipyrin likewise possesses a similar property of increasing the solubility of the salts of quinine, and likewise, added to caffeine, increases the solubility of the latter. It is claimed that it is only necessary to add to the caffeine an equal weight of antipyrin to render the former substance entirely soluble in cold water. With warm water it is claimed that it is possible to dissolve 7½ grains of caffeine in 160 minims of distilled water by the addition of 12 grains of antipyrin, and that the solution so produced is permanently limpid. This increase of the solubility of caffeine by the addition of antipyrin greatly favors its subcutaneous administration, since through its aid 15 grains of caffeine may be dissolved in 3 ounces of water, so that the use of caffeine in neuralgia or migraine will be greatly facilitated by the combination with it of antipyrin; further, the antipyrin may be expected, in these affections, to increase the probability of cure.—*Therapeutic Gazette*.

The Successful Druggist.

"I perused in some recent contemporary of yours the prize essay, 'The Successful Druggist,' with a sort of a tangible smile. A successful druggist has, as a rule, several clerks working in his establishment. The more successful he is the more clerks he employs; but I believe no successful druggist ever did succeed in getting his clerks down to anything like a systematized method of book-keeping or 'putting down,' as it is called, and perhaps that fact is the very reason that the aforesaid prize essayist did not even mention this most worthy item in the line of success. By way of supplement I would therefore put this advice on record to all clerks, and their employers too: No matter how educated you are, or how glib a salesman, you will be a howling failure if you do not get down to the habit of making an entry of every business transaction. If you keep a sales sheet, enter all sales; if you did not sell for cash, don't trust to luck or memory, but put your sale down in the daybook; if you've sold the last bottle of Brown's Salvation Oil, your only possible salvation lies in entering the item in the want book before you engage in conversation with the next customer. Never trust for one second to memory. Do not load up your memory with anything—put it down, enter it up; keep your mental capacity in trim for something else than the dust of memory. Keep your memory well greased by not taxing it at all."—Correspondent of the *National Druggist*.

Capsicum as a Counter-Irritant.

TINCTURE of capsicum is highly recommended by Dr. H. J. Buck, an English physician, as a counter-irritant for the relief of the pain of neuralgia, rheumatism, subacute gout, pleurodynia, etc. It may be applied with a brush as often as desirable, and its effects are often magical. Instant relief is said to attend its use on the tonsils and uvula in relaxed sore throat.—*Lancet*.

In the same journal for May 17th, Dr. James Sawyer, of Birmingham, says: "I am finding excellent results in practice by the use of some preparations of capsicum as rubefacient counter-irritants. In my hands this old remedy, red pepper, has been successful as a local application in cases of subacute gout, in chronic gout, in chronic articular rheumatism, in muscular rheumatism, and also in some cases of bronchial catarrh and chronic bronchitis. After some consideration and observation upon the subject, I decided to employ an ethereal tincture of the drug, and I asked Messrs. Southall to make a new tincture of capsicum of the strength of the alcoholic tincture of the Pharmacopœia, but made with official pure ether instead of with rectified spirit of wine. After some satisfactory use of this ethereal tincture in my own experience as a physician, I now venture to recommend the remedy to my brethren. I find an ethereal tincture of capsicum, by reason of the comparatively rapid evaporation of its ether, can be used more freely than an alcoholic tincture as an application to the skin. Furthermore, I think the solvent action of ether upon the sebaceous secretion of the skin makes ether a menstruum preferable to alcohol for drugs designed to affect the cutaneous surfaces, or to produce therapeutic effects through the skin. If a little ethereal tincture of capsicum be gently rubbed upon the back of a hand, it will produce a feeling of warmth, with some sensation of burning and pricking, in about a minute's time, together with an irregular and patchy hyperæmic redness which may last some hours. If the tincture of capsicum be used as a rubefacient in the form of a liniment, an oily admixture gives frictionability, and an equal part of some bland fixed oil may be added. Solution of ammonia or oil of turpentine, or both of them, in such a liniment are good adjuvants if a sharply rubefacient effect be desired. An excellent and powerful rubefacient liniment may be made of equal parts of ethereal tincture of capsicum, liquor ammoniæ, oleum terebinthinæ, and oleum lini. The ethereal tincture may also be applied to the skin upon spongio-piline."

Chlorodyne Poisoning through the Mother's Milk.—A case is reported in the *Australasian Medical Gazette* of a woman who had recently given birth to twins and was suckling them both. One evening she took a dose of chlorodyne for the relief of pain, and soon after taking the drug suckled the infants. The children were found the following morning profoundly narcotized, and died before evening.

Tests for Quinine.—In order to test the purity of quinine sulphate, 0.2 Gm. of that salt is shaken with 5 C.c. of a mixture of 30 volumes of petroleum ether (spec. grav. 0.680) and 70 volumes of chloroform, and filtered. To the clear filtrate 3 volumes of petroleum ether are added. With pure quinine sulphate the liquid remains clear, whereas in the presence of any other alkaloid an opalescence or precipitate is formed.—E. HIRSCHSOHN in *Pharm. Zeit. Russl.*; Abstract in *J. Soc. Chem. Ind.*

To Destroy Roaches.—The *Med. and Surg. Rep.* gives the following: Roaches may be exterminated if the following powder is liberally sprinkled in the cracks and corners of their rendezvous:

Borax.....	37 parts.
Starch.....	9 "
Cocoa.....	4 "

M.

Toxic Action of Salicylate of Sodium.—G. B. Barron, M.D., reports in the *Lancet* of May 31st a case in which two or three doses of 15 grains each of salicylate of sodium caused, in a woman aged 26 years, an intense erythematous rash, tingling over the whole surface, swelling of the face and extremities, nervous depression and languor, shallow and rapid breathing, severe headache, a pulse of 120 and temperature of 107°. This was afterwards repeated when the medicine was again used, and a remarkable fact was that the patient had previously taken the salicylate from the same package without disturbance.

Menthol as a Remedy in Vomiting.—Recent reports in the *Therap. Monatshefte* speak very highly of the efficacy of menthol as a remedy for vomiting in infants. The following preparation was used:

Menthol.....	gr. 15
Alcohol.....	fl. oz. 1
Syrup.....	fl. oz. ½

and the dose given was one teaspoonful every hour, or less frequently.

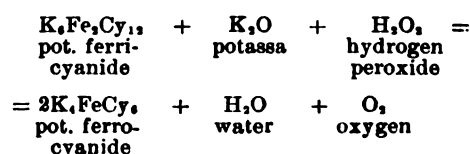
Cocaine Hydrochlorate and Borax.—At a recent meeting of the Paris Société de Pharmacie (*L'Union Pharm.*, May, p. 210), M. Julliard mentioned that in preparing a collyrium containing hydrochlorate of cocaine and borax, upon mixing the solutions a precipitate was formed, consisting of cocaine which had been thrown out by the soda of the borax. Of course the ordinary method of filtering would here have involved the removal of a certain quantity of the more important constituent. It was pointed out by M. Patein that although borax is neutral towards reagents when in concentrated solution, it becomes alkaline in dilute solution, and it was suggested that the addition of a little boric acid would have maintained the collyrium clear without affecting its properties.—*Pharm. Jour*.

New Analysis of Myrrh.—Oscar Koehler has made a new analysis of myrrh in the laboratory of Prof. Reichardt, of Jena, and reports his results in the *Arch. der Pharm.* The following is a summary:

Myrrh consists of:

1. Gum, 57 to 59 per cent. Soluble in water, insoluble in alcohol.
2. Resin—a mixture of different resins, in largest proportion a soft resin, of neutral reaction, soluble in alcohol and ether. There are also present two different dibasic resin acids.
3. Ethereal Oil, 7 to 8 per cent (former analysts report only 2.18 per cent).

New Method of Generating Oxygen Gas.—A new, though perhaps not economical method of preparing pure oxygen gas is the following, according to George Kassner (in *Chem. Zeit.*): Make a solution of ferricyanide of potassium in peroxide of hydrogen, and introduce it into a flask with delivery tube and connected with a reservoir of solution of potassa. If the latter is allowed access to the solution, drop by drop, oxygen gas will be given up. The reaction is as follows:



Kola Nut in Sea-Sickness.—Kola has been "boomed" lately, and the Director-General of the Medical Department of the British Navy is assisting in the process. He has communicated to the medical papers a letter from Dr. C. W. Hamilton, in which it is spoken of as "a most

successful remedy" for sea-sickness. Half to one drachm of the seed chewed slowly was followed, in about forty minutes, by complete cessation of the various symptoms of *mal de mer*. Its action in sea-sickness seems to be the giving of tone to the nervous system, proving a stimulant—acting generally and locally. As a good deal of attention is now directed to this drug, it would be advantageous, Dr. Hamilton thinks, if for future trials pharmaceutical chemists would provide a neater, more portable and efficient preparation than the kola seed, which seems reliable only when freshly procured.—*Chem. and Drugg.*

Unguentum Hydrargyri Nitratii, with Vaseline.—Mr. Adolph W. Borchers, Ph.G., as the result of a number of experiments on different oils and fats as bases for this ointment, recommends the following formula:

Neatsfoot Oil.....	3½ tr. oz.
Vaseline.....	4 drachms.
Nitric Acid.....	420 grains.
Mercury.....	180 "

Mix the oil and vaseline, heat in a water-bath at 200° F., at which temperature add the mercury, previously dissolved in the acid and slightly warmed. Stir occasionally until the reaction is completed, then allow to cool until it begins to thicken, but not permitting it to get cold. Then transfer to a mortar, and triturate briskly until it becomes very light in color.

The ointment so made retains its color and consistence for a long time.—*Proceed. Cal. Pharm. Soc.*

Caledonian Balsam.—At a recent meeting of the Société de Thérapeutique, Dr. Forné called attention to the advantages presented by a preparation that he had named "baume calédonien," and which appeared to consist of a solution of kauri gum in an equal weight of 90-per-cent alcohol (*Jour. Phar. Chim.*, May 1st, p. 504). He stated that it had been used with great success in the treatment of wounds and ulcers of all kinds. When applied to a well cleansed and dried wound it causes a very slight but brief sensation of burning, but after a few moments the solvent evaporates, and the resin is left as a very adherent varnish, which is not affected by friction or contact with water. The preparation can also be used advantageously for fixed bandages in the place of the soluble silicate. It was also said to be superior to tincture of benzoin for the obturation of the cavities in carious teeth. Lastly, a liniment made with equal quantities of baume calédonien and olive oil was recommended as an application to burns.—*Pharm. Jour.*

Soluble Essence of Ginger.—W. H. McGrath, in the *Chemist and Druggist*, gives details for producing an essence for which he claims the following points. It is as strong as possible compatible with its solubility, possesses a fine aroma peculiar to Jamaica ginger, and is perfectly free from capsicum. Shake together ginger in coarse powder 1½ pounds, and alcohol (60 per cent) 2 pints and 5 ounces, water 15 ounces, repeating the shaking frequently during ten days. Then percolate, press, and filter, the product being about 45 ounces. Take 40 fluidounces of this tincture, 40 ounces of water, and mix. Add to it three-quarters of an ounce of phosphate of soda dissolved in 5 ounces of boiling water and allowed to cool. Shake well. Next add one-quarter ounce of fine calcium chloride dissolved in 5 ounces of nearly cold water. Shake well and allow to stand twelve hours and filter. The filtered solution is placed in a still and distilled at a very low temperature, reserving the first 30 ounces for further use. Distill a further quantity of 40 fluidounces, and allow the still to cool. The residue in the still, which will be about 18 fluidounces, is what is required, and is gotten out by rinsing the still with the 30 ounces first reserved. Filter once more through double paper. The product is 40 fluidounces of a fine amber-colored essence, almost entirely soluble in water.

Carter's Little Liver Pills.—Weight of twelve pills about 7½ grains, of which probably 2 to 2½ grains is sugar-coating. They contain podophyllin and aloes, made into a pill and coated with sugar. On the above we deduce the following formula as closely resembling the original:

Podophyllin.....	1½ grs.
Aloes, Socotrine.....	8½ "
Mucilage of Acacia.....	q. s.

Mix, divide into twelve pills, and coat with sugar.—*The New Idea.*

Honey of Roses.—E. Daenen, of Brussels, gives the following method for preparing a bright rose-colored, transparent, and delightfully odorous preparation:

Infuse 100 Gm. of bruised red-rose petals with 400 C.c. of boiling distilled water for six hours, strain, again infuse for six hours in 200 C.c. of boiling distilled water, and repeat, if necessary, with another 200 C.c. Mix the infusions and evaporate to 170 Gm., filter, and in the filtrate dissolve 500 Gm. of clarified honey and 330 Gm. of white sugar.

Japanese Paper as a Container for Medicine.—Dr. A. Hoffmann has added another to the methods at present

in vogue for taking powders, such as wafers, tablets, capsules; he recommends Japanese vegetable paper, in which the powder is wrapped and the whole swallowed. The source of the paper, according to Uloth, is *Wickstroemia canescens*, of the natural order Thymelacæ, and the product is known in commerce as Usego. Hoffmann states the advantages of the material to be cheapness and easy digestibility.

[One of us has for many years resorted to the use of the thin tissue paper used between visiting cards as a container for administering bad-tasting medicines. Like the Japanese paper referred to, it is of vegetable fibre, and quickly disintegrates in the presence of fluids in the stomach.—*Ed. Am. Drugg.*]

Compound Cathartic Pills.—Prof. W. M. Searby, of the California College of Pharmacy, complains that the compound cathartic pill, U. S. Ph., gripes very much, and this he attributes to the jalap not being sufficiently finely divided. To remedy this he suggests the addition of a little soap, which not only tends to divide the very active matters, but also assists in their solution when introduced into the stomach. It also gives to the mass a plastic consistence, so that the pills are easily made to retain their form. Pills made according to the following formula act pleasantly, quickly, and effectively, without any griping whatever:

	Grains.
Compound Extract of Colocynth.....	180
Resin of Jalap.....	18
Calomel.....	100
Gamboge, in fine powder.....	25
Castile Soap, in powder.....	50
Water.....	6
Total.....	329

To make one hundred pills.

The pills thus made weigh 3¼ grains, which is a trifle less than the pills of the Pharmacopœia of 1880.—*Proceed. Cal. Pharm. Soc. and Chem. and Drugg.*

Gurjun Oil as an Expectorant.—Dr. William Murrell, of London, England, has been trying gurjun balsam as an expectorant in cases of chronic bronchitis, and writes to the *Lancet* of May 3d that he has thus found 2 drachms of the balsam in an ounce of extract of malt, given three times a day, to be the best form for using it. Compared with balsam of copaiba, it seems less apt to disturb the digestive organs and skin, and patients who had taken both spoke commendatorily of the former as clearing the chest and easing the cough.

The gullibility of our English cousins is a perpetual source of wonder to Americans, just as the propensity of the latter to practical joking is a perpetual snare and delusion to the average Englishman. Where on earth but in England could so manifest a lie as the following (which we copy from the *Monthly Magazine of Pharmacy*) receive credence? "The turpentine crop is likely to suffer in the United States for the want of axes. The great axe factories were destroyed last year by the floods, so that the turpentine farmers of the Southern States cannot get axes enough to supply the workmen." One single factory in Hartford, Conn., or Providence, R. I., turns out enough axes every week to put a new one into the hands of every turpentine "boxer" in the United States.—*Western Druggist.*

A Valuable Remedy for Brain Workers.—We have received several inquiries concerning a much-advertised secret remedy which has found great favor among the clergy in the West, possibly because they have a percentage on all the custom which they can bring to the "professor." The remedy is sent, on the receipt of a pledge of secrecy, to any one for the trifling sum of \$10, \$6 of which is given to the clergyman who secures the order. Sometimes it is the clergyman himself who is sold. A correspondent of the *Medical Standard* says that the remedy is nothing more or less than a daily enema of two gallons of water, "persistence in which," the accompanying pamphlet says, "will remove the microbes of the intestinal tract from the stomach down."

Orthine is a new candidate for favor as an antipyretic. It is a derivative of phenylhydrazin, obtained by the combination of hydrazin with paraoxybenzoic acid. In doses of 30 to 50 C.c. it has been found an active agent in pneumonia, articular rheumatism, and typhoid fever; but its action is uncertain, and its disadvantages are serious when compared with the slight advantages it may possess.

Mr. C. F. W. Meister, one of the original founders of the Höchst factory, has just retired from the active partnership on the ground of advanced age. At his retirement he placed the sum of 100,000 marks at the disposal of the board of directors for the purpose of establishing a home for old workmen of the factory.

Paraffin, when treated with solvents, behaves like a colloid. It yields jellies with benzol, chloroform, and especially with ether. In acetic acid it behaves like a crystalloid. The condition of paraffin in crude petroleum may thus be explained.—B. PAWLEWSKI, in *Ber. d. Chem. Ges.*, xxiii., 327.

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EDITORIAL.

A VERY instructive case—instructive for those who advocate *general* standardization of pharmaceutical preparations, without being aware of the difficulties in the way—has recently occurred in Germany.

The police authorities of Berlin some time ago procured samples of a liquid and of pills (*Liqueur de Laville*; *Laville's Pills*) which were sold as nostrums for gout, with a view of ascertaining whether they contained any ingredient the dispensation of which was forbidden except on a physician's prescription, and also whether the price asked for the articles exceeded the legal rate established for medicines. The expert who analyzed the preparation—Dr. Bischoff—declared that the pills consisted of a vegetable powder, with silicate of soda, and a bitter vegetable extract, possibly containing extract of *alkekengi*, and probably extract of *colocynth*. The liquor, the composition of which was given in an accompanying pamphlet, was found not to correspond to this at all, but to contain *colchicine* as active constituent.

In consequence of this report the police ordered the manufacturer to furnish the exact formula by which the preparations were made. For the solution the following ingredients were given: Active principles of *convallaria*, *Fraxinus excelsior*, *gentian*, *squill*; *quinine*, *cinchonine*, *calcium chloride*; *sodium phosphate*; *alcohol*, *wine*, *water*. And for the pills: "Active principle of *alkekengi*"; *sodium silicate*; *sodium carbonate*; *powd. Teucrium Chamædrys*.

Dr. Bischoff now repeated his analysis, and reasserted the presence of *colchicine* in the liquid, stating that it corresponded in quantity to that contained in wine of *colchicum*. This time he also found traces of *cinchona alkaloids*, which had been overlooked in the first analysis owing to the smallness of the sample examined.

On the strength of this report the police authorities preferred charges against the manufacturer and seller before the criminal court. The accused had secured the services of Dr. Friedlaender as chemical expert, who testified that both preparations were made in accordance with the formulæ furnished by the manufacturer. The liquor was found by him to "contain a body giving reactions similar to *colchicine*, without its being capable of being exactly identified with this alkaloid."

Owing to the discrepancy between the two experts, the case was referred to the Medicinal-Kollegium (Medical Council), which, unfortunately, did not possess among its number any analyst of recognized authority. Nevertheless it rendered a decision, stating among other things that the "liquor contains *colchicine*."

The case being closed, the accused was condemned to imprisonment for six weeks, but immediately appealed against this sentence, and succeeded in having the investigation of the two preparations referred to the official chemists, Dr. Bein and Dr. Jeserich. These experts made a most exhaustive report, from which we translate (in abstract after *Pharm. Zeitung*) the following passages particularly bearing upon the features interesting us here:

"The liquor contains a substance giving the reactions of *colchicine*; but the actual presence of the latter is not demonstrated thereby with full certainty."

"Glucoside bodies are present."

"The composition alleged by the formula furnished cannot at this time be completely confirmed, and still less disproved. The present state of science renders the quantitative determination of its constituents as yet impracticable."

The above passages are from Dr. Bein's report. From Dr. Jeserich's we take the following:

"The reactions which in other cases undoubtedly demonstrate the presence of *colchicine*, cannot be used in the present case as a scientific, absolute, and undoubted proof of the presence of *colchicine*, for the reason that certain other bodies are present which, as has been shown by careful experiments, yield reactions exactly identical with those afforded by *colchicine*. It has been demonstrated that these reactions even appear when the acidulated solution had been shaken out with chloroform. Moreover, in this case nitric acid produces a magnificent reaction of *scillitoxin*, while the same reaction is scarcely visible when applied to the pure *scillitoxin* of commerce. And this very reaction is at the same time the most delicate one for *colchicine*. Therefore, since every reaction which is characteristic for *colchicine* may, in the present case, be due to other substances, the presence of *colchicine* is not established with scientific accuracy. On the other hand, it is equally impossible to prove that the substances named by the manufacturer are absent, since a mixture purposely prepared according to the furnished formula completely corresponds in its reactions with the purchased sample," etc.

There being so much discrepancy among the various experts, the matter was at last referred by the government to Prof. Liebreich, who reported that the liquor did contain *colchicine*, but also stated that the composition of such a complex mixture is not amenable to a complete qualitative or quantitative chemical analysis.

This case is of special interest, since it demonstrates that even a well-defined alkaloid such as *colchicine*, the identification and estimation of which, in a preparation known to be derived from *colchicum* alone, present no difficulty, becomes an object of doubt and uncertainty when present or suspected to be present in compounds or preparations of unknown origin.

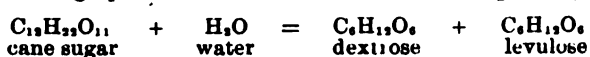
THE classical researches of Emil Fischer, on the chemical constitution of the various sugars and their relation to each other, have already led to very important results. It has been demonstrated that the various sugars may all be artificially prepared from glycerin, which itself may be built up from the elements. Hence the synthetic preparation of the sugars is an accomplished fact. Of course, the way by which this is accomplished at present is an exceedingly tedious and expensive one, and it is questionable whether any practical use will ever be made of it, that is, so far as to make sugar from glycerin.

But there is a problem, intimately connected with this field of chemistry, which will surely be solved one day, perhaps before the new century arrives, and that is, the conversion of glucose into sucrose, or cane sugar.

The accomplishment of this chemical feat will revolutionize the national economy of many countries. It will utterly cut away the bottom from all laws or acts placing a tariff, either as export or import duties, upon cane sugar, and will completely change the conditions of planting, crops, and living of the sugar-raising districts.

Cane sugar ($C_{12}H_{22}O_{11}$), as is well known, may be converted—or, as it is called technically, *inverted*—by very simple means; for instance, by boiling with a dilute acid

it is converted into a mixture of equal parts of *dextrose* or *glucose* (turning the polarized ray to the right), and *levulose* or *fruit sugar* (turning the polarized ray to the left). The change is accompanied merely by the cane sugar taking up one molecule of water and then splitting up:



The optical antagonism between the two derivatives is not equal; while dextrose polarizes 56° to the right at all temperatures, levulose polarizes at 106° to the left at 14°C ., the angle diminishing as the temperature rises.

Without entering into speculations regarding the cause of the latter phenomenon, it may nevertheless be stated that modern chemical views incline to a conception according to which the stereochemical molecules of two chemical compounds polarizing in opposite directions, and both representing the original component parts of another definite chemical compound, differ merely by inverted form, so that one may be regarded as the reflected image of the other. Cane sugar, as is well known, belongs to the monoclinic system of crystals, having the form of oblique rectangular prisms. Let us imagine such a prism to be split in two by a section through its opposite long edges. We will obtain two semi-prisms of exactly opposite configuration. By placing them upon each other by their cut surfaces, superimposed in the same position in which the pieces were before cutting, the original form will be reproduced. But in any other position this will not be the case. Thus it may be imagined that the inversion of cane sugar, besides making a slight change in the molecule (from $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ to $\text{C}_{12}\text{H}_{22}\text{O}_{12}$ or $2\text{C}_6\text{H}_{12}\text{O}_6$), also splits the original prism into two semi-prisms (to use this term here). Now, since the problem of recombining certain other optically opposite but mutually related compounds has been successfully accomplished—for instance, dextro- and lævo-tartaric to racemic acid, etc.—it is expected that the recombination of glucose and levulose into cane sugar will eventually be accomplished. This would, however, not be of great practical importance, unless there were opened up natural sources of levulose more abundant than those now available.

The successful accomplishment of the problem of converting glucose into cane sugar would bestow upon the discoverer—or, at least, upon the patentee, who often reaps the benefit in place of the former—untold riches, and would effectually and permanently wipe out the Sugar Trust.

Supplement to the British Pharmacopœia.—Some time ago the Pharmacopœia Committee of the British Medical Council requested the twenty medical bodies represented in the Council to make suggestions of such of the newer remedies as appeared to them of sufficient merit to deserve insertion in a contemplated "Addendum" to the British Pharmacopœia. From twelve of the aforesaid bodies replies were received. It is hinted by some of our correspondents, and it seems by no means without reason, that these bodies, or at least their representatives who furnished the replies, are not altogether of sufficient standing or authority to be recognized as the official mouthpieces of the medical profession of Great Britain. However, we are not competent judges of this fact, and merely state what has come to us from a very reliable source. Altogether 130 new drugs and preparations were recommended by the contributors. Among these we find articles which are either entirely proprietary (such as creolin, ichthyol) or at least controlled by and exclusively produced under patents. Some of them will recall to the memory of many of our readers certain legal proceedings of recent date—for instance, "Caffeinæ Hydrobromas granulatus."

The Pharmacopœia Committee finally selected the following thirty-seven medicines and compounds, regarding which the assistance of the Pharmaceutical Society has been recently invoked by the Council, with a view of properly defining and preparing them:

Acetum Ipecacuanhæ, Adeps Lanæ (lanolin), Emplastrum Menthol, Eucalypti Gummi, Euonymus atropurpureus (a preparation of), Extractum Hamamelidis liquidum, Extractum Hydrastis liquidum, Ferri Subchloridum (preparations of), Hamamelis Virginica, Homatropinæ Hydrobromas, Hydrastis Canadensis, Liquor Cocainæ Hydrochloratis, Liquor Morphinæ Sulphatis, Liquor Trinitrinæ (sol. of nitroglycerin), Magnesii Sulphas effervescens, Mistura Olei Ricini, Oleum Cadinum, Paraldehydum, *Phenylon* (a name devised by Prof. Attfield, we believe, for "antipyrin"), Pilula Ferri (Blaud), Picrotoxinum, Saccharinum, Sodii Benzoas, Sodii Nitris, Sodii Phosphas effervescens, Sodii Sulphas effervescens,

Stramonii Folia, Strophanthi Hispidi Semina, Sulphonal, Suppositoria Glycerini, Tinct. Hamamelidis, Tinct. Hydrastis, Tinct. Strophanthi, Trochisci Sulphuris, Unguentum Conii, Ung. Hamamelidis.

No More International Pharmaceutical Congresses.—The Italian Committee having in charge the preliminary arrangements for the International Pharmaceutical Congress, which was to have assembled at Milan in 1888, but which had been postponed to 1889, and then again to the present year, have announced that the responses to their invitation to participate in the Congress have been too inadequate and discouraging to warrant their issuing the final call. They have, therefore, decided to abandon the project entirely.

Most likely this will be the end of these congresses. Originally they were started by enthusiastic champions of international uniformity in medicine and pharmaceutical standards. Much time and labor were consumed over the preparation of an international pharmacopœia, which even culminated in the presentation of a draft of such a work by A. v. Waldheim, of Vienna. But no attention whatever was subsequently paid to this draft by any pharmacopœia committee here or in Europe, and it is pretty certain that the same fate would befall any other draft gotten up in any one place or locality without consultation of the representatives of other countries.

Influence of Improved Manufacturing Methods upon the Intelligence of Workmen.

As an interesting proof of the fact that workmen, even of the ordinary, often illiterate type, will advance in intelligence and reasoning powers with the introduction of improved methods and apparatus in manufacturing, the *Chemist and Druggist* makes the following remarks in an editorial of May 24th:

It is extremely interesting to note the influence which is produced on the work-people by the introduction of more refined methods of manufacture. This development of skill on the part of the ordinary workman is shown in marked degree in the Chance-Claus method of sulphur recovery from the tank waste. In one of the works where this is carried on there are 4 sets of 7 carbonators, 28 in all, connected by series of pipes provided with cocks for directing the passage of the gases, which take part in the operations, in or out of the several vessels. Arranged in a single building, and connected with these carbonating vessels, there may be counted no less than 204 cocks. The correct position of each one of these is essential to the continuance of the operations: any misplacement would cause complete confusion. Yet such is the developing power of these advanced methods of manufacture that it has been found possible in the various works to select from among the ranks of the ordinary workmen those who can be trusted to control this complicated apparatus. Moreover, the man in charge ascertains at intervals the quality of the gases which pass through the vessels under his care, by withdrawing a sample, and with graduated tube and absorbing solution ascertaining, by process of gas analysis, the amount of active gas in the mixture with which he is dealing. Thus the man is raised from the mere toiler, valuable mainly in proportion to his strength of muscle, to a skilled artisan, where his powers of thought and judgment are brought into play as well as those of hand and arm.

New Specific-Gravity Table of Sulphuric Acid.

G. LUNGE and M. ISLER have made a new and careful determination of the specific gravities of various strengths of sulphuric acid, and have published an elaborate table (in *Zeitsch. f. angew. Chem.*, 1890, 133) giving the corresponding values of density (true specific gravity, Beaumé and Twaddell) percentage by weight and volume. The authors are certain that Kolb—whose table has up to the present time been considered the most reliable—has made numerous experimental errors, particularly in the most dilute acid.

So far as an acid of specific gravity 1.840 is concerned, the new table comes very near the percentage 96, which has been set equivalent to the former. According to Lunge and Isler the true percentage at a specific gravity of 1.840 is 95.6, and corresponds to 65.9° Beaumé, or 168° Twaddell. The specific gravity is understood to be taken at 15°C ., compared with water at 4°C .

Diluted sulphuric acid, U. S. Ph., contains 10% of absolute acid. The U. S. Ph. gives the specific gravity as "1.067 (nearly)." The new table has the values:

$$\begin{aligned} 1.065 &= 9.47\% \\ 1.070 &= 10.19\% \end{aligned}$$

from which, by interpolation, we find

$$1.06826 = 10\%$$

Recent investigation has shown that the people of Great Britain swallow over 5,500,000 pills daily, or one pill a week for every person in the population. The pill consumption for one year would weigh 170 tons, and would fill thirty-six freight cars.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,458.—Patent Rights in Bolivia (M. P. & Co.).

We are not sufficiently posted on the patent laws of the different countries to give expert advice. You will have to consult a professional patent lawyer. This much we may say, that a Bolivian patent costs about \$330, and runs for a period not exceeding ten years, the time depending upon the pleasure of the government.

No. 2,459.—Ozonized Ether (Munro).

Ether is known to be a good solvent of ozone. It may even extract the latter from its aqueous solution. Ozonized ether is sometimes used as an agent for bleaching, when fatty substances are to be extracted at the same time; but care must be taken lest it be too strong or act too long. It may be prepared as follows:

Barium Peroxide.....	1 part.
Hydrochloric Acid.....	2 parts.
Ether, stronger.....	.50 "
Distilled Water.....	8 "

Place the peroxide of barium, in small pieces or powder, into a flask standing in cold water, pour in the ether, and very gradually add, under constant agitation, a previously prepared mixture of the acid and water, the flask being carefully corked to avoid loss. After one hour pour off the ethereal liquid and keep it in a cool and dark place in well-stoppered bottles.

No. 2,460.—Pure Salicylic Acid (W. O. S.).

There is no difficulty in obtaining absolutely pure salicylic acid; only you must not expect to purchase it at the same price as the ordinary kind. If you do not want to go as far as using the natural acid from oil of wintergreen—which is, indeed, advocated as the sole admissible one, as an internal medicine, by several authorities—you may at least procure the recrystallized, or *dialyzed*, salicylic acid, costing about one-third more than the common. The latter has long been known to contain small proportions of other substances. Some of these are left behind when the acid is sublimed. B. Fischer and others have recently found impurities not heretofore observed—for instance, from 0.5 to 1 per cent of creosotic acids. These are now being removed as far as practicable even from the ordinary commercial acid.

No. 2,461.—Solution of Albuminate of Iron (N. S.).

A number of formulæ have been recommended for this preparation. One of the least complicated is the following, which yields a *neutral* solution:

Egg Albumen, dry.....	1 part.
Solution of Oxylchloride of Iron (Dialyzed Iron)	
Pharm. Germ. [= 3.5% Fe]	12 parts.
Alcohol.....	8 "
Distilled Water.....	.75 "
Cinnamon Water.....	enough to make 100 "

Dissolve the egg albumen in 35 parts of the distilled water and filter the solution. [If fresh egg albumen is to be used, take 7 parts of this, shake it with 29 parts of distilled water, and filter through absorbent cotton.] Mix the dialyzed iron with 40 parts of distilled water, add it to the albumen solution, and heat the mixture on a water-bath, during one hour, at a temperature of 176° to 190° F. Then allow it to cool, add the alcohol, and lastly enough cinnamon water to make 100 parts.

The product is a reddish-brown liquid, appearing clear by transmitted, turbid by reflected light. Every 100 parts contain 0.41 parts of metallic iron.

This solution may be mixed with alcohol in all proportions without throwing down a precipitate. It also re-

mains unchanged when heated. Ammonia produces a precipitate soluble in an excess. Acids cause precipitation.

No. 2,462.—Syrup of Ammonium Chloride (J. C. McC.).

This preparation is usually made after the following formula (according to report of National Formulary Committee, Proceed. Am. Pharm. Assoc., vol. 34):

Chloride of Ammonium.....	2½ tr. oz.
Sugar.....	10 " "
Water.....	to make 16 fl. oz.

Dissolve the chloride of ammonium in 8 fl. oz. of water; add the sugar and enough water so that when the sugar is dissolved by agitation the product will measure 16 fl. oz.

No. 2,463.—Reactions and Constituents of Animal Saliva (Cincinnati).

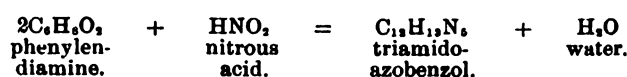
Normal saliva, of man as well as all warm-blooded animals, has an alkaline reaction, at least while secreted during mastication and during the first hours of digestion. By being kept in the mouth, especially in presence of carious teeth, it may assume an acid reaction. This also happens in certain diseases.

The most important constituent of the saliva is diastase. This is a generic name applied to certain ferments which are capable of converting starch, in presence of water, into dextrin and glucose or maltose. This ferment appears to be an albuminoid, but has never yet been isolated. It may be detected in the saliva in the following manner:

Collect about 5 C.c. of saliva (the mouth having previously been well rinsed with water), put it into a test tube together with 50 C.c. of solution of starch (1 in 100), and place the tube into a warm air-bath kept at a temperature of 38° to 41° C. The presence of dextrin and sugar will be revealed by appropriate tests after a short time, and the progressive ratio of saccharification can be estimated by means of Fehling's solution, although this does not convey any idea as to the amount of the ferment present. Indeed, it is very likely that the ferment is not altogether, or perhaps not at all, used up by the process of saccharification.

Another constituent of saliva, which, however, is sometimes absent, is nitrous acid combined with alkalies.

Its presence is detected by acidulating a little saliva, in a test tube, with sulphuric acid, and then adding solution of starch and iodide of potassium. If nitrous acid or a nitrite is present, iodine will be liberated and blue iodide of starch formed. Or saliva is diluted with 5 volumes of water, acidulated with a few drops of sulphuric acid, and mixed with a little metadiamidobenzol (also called phenyldiamine, $C_6H_5N_2$, melting at 63° C.). If nitrites are present, the liquid turns more or less intensely yellow, the color arising from the formation of triamidobenzol:



No. 2,464.—Ice Machine (Texas).

These machines for the artificial preparation of ice are so little used in this region that we are not able to answer your question as clearly as we would like. If you can inform us of some one who is the agent for the machine in this country, it would be easier to get the information. It is probable that the sulphuric acid has become so saturated with moisture that it has lost its power to absorb more. In an article by C. H. Peabody in the *Technological Quarterly* for May, 1889, it is stated that the sulphuric acid should be concentrated. We do not see how the addition of lime could be of any assistance if it is to come into contact with the acid.

Formulæ asked for:

1. Paine's Celery Compound.
2. Bush's Bovinine.
3. S. S. S.—Swift's Specific.
4. Greene's Nervura Nerve Tonic.

BIBLIOGRAPHY.

A NEW MEDICAL DICTIONARY: Including all the Words and Phrases used in Medicine, with their Proper Pronunciation and Definitions, Based on Recent Medical Literature. By GEORGE M. GOULD, B.A., M.D., Ophthalmic surgeon to the Philadelphia Hospital, and Clinical Chief, Ophthalmological Department, German Hospital. With elaborate Tables of the Bacilli, Micrococci, Leucococci, Ptomaines, etc.; of the

Arteries, Ganglia, Muscles, Nerves, and Plexuses; of Weights and Measures, Thermometers, etc.; and Appendices containing Classified Tables, with Analyses, of the Waters of the Mineral Springs of the U. S., and Tables of Vital Statistics. Philadelphia: P. Blakiston, Son & Co., 1890, page 519, 8vo, half-roan.

THE title would have been improved by reading: "Including all the words and phrases commonly used," etc., for the work is not by any means a complete glossary of medical terms. It has the merit, however, of including a

very large proportion of the words and terms which have been introduced during the past ten years, and of being of convenient size, well arranged, and quite as comprehensive as the needs of the majority of students and physicians demand. By an arrangement of sub-titles much space has been gained without much increase of labor required for reference. The incorporation of numerous titles of tests, solutions, instruments, etc., not heretofore found in medical dictionaries, is a feature worthy of especial notice.

American Druggist

Vol. XIX. No. 8.

NEW YORK, AUGUST, 1890.

Whole No. 194.

[ORIGINAL COMMUNICATION.]

AN EXTEMPORANEOUS NITROMETER FOR THE ASSAY OF SPIRITUS ÆTHERIS NITROSI.*

BY WILLIAM P. DE FOREST, BROOKLYN, N. Y.

PROF. A. H. ALLEN, of England, was the first to propose that the volume of gas given off by the combination of spirit of nitre, solution of iodide of potassium, and diluted sulphuric acid, measured in a nitrometer, should be used to determine the percentage of ethyl nitrite in the spirit of nitre under examination. This reaction has been shown to you before, and my object this afternoon is simply to demonstrate how easy it is for any one who does not own, and who does not wish to spend three or more dollars for, a nitrometer, to make one for himself at but little cost and little trouble. As volumetric solutions are official, and many of the articles of the U. S. P. are directed to be assayed by them, a burette is essential for their use; and as all the members of this Society are supposed to follow the directions of the Pharmacopœia, I must assume that all the gentlemen before me to-day own a burette. In the top of the burette fits tightly a rubber cork, through which passes a glass tube of not more than 1½ inches in length, provided with a piece of rubber tubing of about the same length. Over the lower end of the burette is slipped a piece of rubber tubing of about 2 feet in length, in the free end of which is inserted a piece of glass tubing 1 foot in length. Another piece of rubber tubing, about 3½ feet long, with a small piece of glass tubing in each end, is needed to be attached to the tube in the rubber cork, also a glass funnel of about 3 or 4 drachms capacity, an ordinary 8-ounce bottle, and a pinchcock. These comprise the whole outfit, except the solutions, which consist of a solution of iodide of potassium (2 in 5) and diluted sulphuric acid (2 in 6), a saturated solution of salt, and a sample of spirit of nitre.

The space in the burette between the rubber cork and the first graduation of the tube must be ascertained, as that has to be added to the rest of the figures. In the burette I am using this afternoon I have found this space to measure 7.75 C.c.

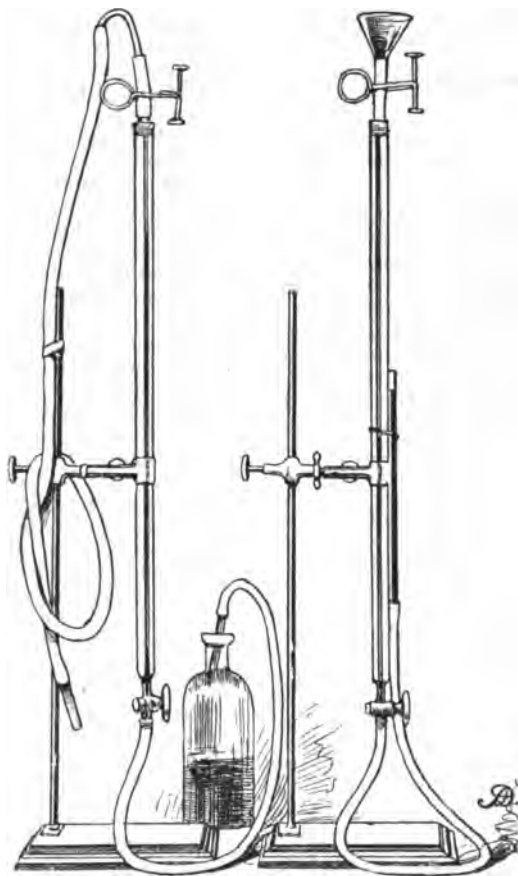
I now place my rubber cork in the burette and tie it down securely, fill my 8-ounce bottle with the brine, and place in it the glass tube of the rubber attached to the lower end of the burette. The longer piece of rubber tubing I connect with the rubber cork. By sucking I fill the burette and the little glass tube with the brine, and compress the small piece of rubber tubing on top with the pinchcock; then taking off the long rubber tube on top, I put in its place the glass funnel. Measuring out 3 C.c. (48 min.) of spirit of nitre, I place that in the funnel, and very carefully opening the pinchcock, let it down into the burette. This is followed by 5 C.c. (81 min.) of the solution of iodide of potassium, and after that has been passed into the burette, 5 C.c. (81 min.) of the diluted sulphuric acid are run in in the same manner, care being taken each time not to admit any air with the liquids.

The reaction commences immediately, and by raising the bottle of brine, withdrawing the glass tube, fastening it to the burette so that the liquid in both will be on the same level, you will very soon be able to read off the volume of gas obtained. In the experiment I have just performed I find the liquid in the burette has been forced down to the mark 26.5 C.c. Adding to this 7.75 C.c., the measure of the space above the markings, makes 26.5 C.c. + 7.75 C.c. = 34.25 C.c. This represents the amount of gas disengaged from the 3 C.c. of spirit of nitre. Dividing this by 6.66 (see below) will give the per cent of ethyl nitrite: $34.25 \div 6.66 = 5.14$ per cent; and this is

about the percentage of ethyl nitrite that the sample I have here contains. Of course this is not claimed to be absolutely accurate, but it will give an approximate idea of how strong your sample of spirit of nitre is, and it is a handy method, within the reach of any druggist. The reason I take 3 C.c. of the spirit of nitre is this, that my tube is not long enough to allow the reaction to take place successfully if 5 C.c. of spirit of nitre containing 5 per cent ethyl nitrite were employed.

The spirit of nitre I have assayed this afternoon was made by myself in my pharmacy yesterday, after the process proposed by Dr. Squibb in the *Ephemeris* for July, 1888.

The divisor 6.66, mentioned above, is used on the authority of Dr. Squibb (see *Ephemeris*, July, 1889), who, after a number of experiments with a solution of pure ethyl nitrite in absolute alcohol, found that 3 C.c. of a 5-per-cent solution liberated, on the average, 33.33 C.c. of gas; the same quantity of a 1-per-cent solution would liberate 6.66 C.c. of gas. So in order to determine the amount of ethyl nitrite in 3 C.c. of the spirit of nitre under investigation, it is necessary to divide the number of cubic centimeters of gas obtained by 6.66, and the quotient will be the percentage. If a larger tube be used, one twice as large or four times as large as an ordinary burette, and the amount of spirit of nitre increased to 5 C.c. or 10 C.c., a different divisor would have to be employed. For 5 C.c. it would be 11.11, and for 10 C.c. it would be 22.22. Of course in each case the amount of gas obtained would be proportionately larger and the result the same as for the 3 C.c.



De Forest's Nitrometer.

A New Spice Adulterant.

FRANK A. HENNESSY, PH.G., contributes to the *American Journal of Pharmacy* a description of a substance which has been placed on the market as an adulterant for ground spices, known as "spice mixtures." The manufacture is conducted in a large bakery in Philadelphia.

The substance forming the basis of these mixtures, and known as "meal," was found to be a low grade of wheat. It is not known among millers by any special name, but might be called "blow-room stuff." It is a little better than feed, to which it is sometimes added to improve the quality, but is a lower grade than middlings. The meal is made into dough with water, rolled out and cut in the same manner as soda crackers, and baked in an oven. These crackers, or biscuits, as they are termed, are then allowed to dry thoroughly, when they are ready for grinding. The different

shades are obtained by the use of coloring matters mixed with the meal in the preparation of the dough.

The "white" biscuit is made from the plain meal without coloring. The "yellow" is made with the aid of turmeric, a little of which goes a great way in imparting a rich yellow hue, such as is peculiar to mustard.

A sample of the coloring matter used in the "brown" biscuits is also presented. An analysis shows this to be a mixture of about equal parts of Spanish brown and turmeric.

Charcoal is used in the "black" biscuits.

Some biscuits having a red color, such as might have been used to adulterate Cayenne pepper, were seen, but it was impossible to secure samples at the time.

Large quantities of these spice biscuits have been delivered to a spice house in Philadelphia, and it is not known that any have been shipped out of the city. As they are all sent to the spice dealers in the whole condition, probably on account of the lack of facilities for grinding, the samples of powder which are presented were ground by the writer in a small drug mill, and may only roughly resemble the powders prepared by these spice millers.

However, they will serve to show how closely the ground spices may be imitated.

The sample labelled "pepper mixture" is made up of

* Read before the Kings County Pharmaceutical Society, April 8th, 1890.

the "black," "white," and "brown" powders; the one labelled "clove mixture," of the "brown" and "black."

"Cracker dust" is said by many investigators to be used as a spice adulterant, and a sample of this material from the same bakery is presented, although it has never been used in the manufacture of these biscuits. It consists altogether of stale bread, which accumulates in large quantities, and which is thoroughly dried and ground.

An analysis of the spice biscuits gave the following results, the "black" and "white" powders and the original meal being taken:

	White.	Black.	Meal.
Moisture.....	7.52	8.27	.....
Soluble ash (HCl).....	3.00	4.98	2.95
Insoluble ash (HCl).....	Trace.	4.45	.....
Total ash.....	3.00	9.43	2.95
Glucose.....	14.51	14.51	14.51
Cane sugar.....	6.08	3.02	11.02
Residue after treatment with cold H ₂ O and dried at 100° C.....	75.8	83.2	65.8
Charcoal and matter insoluble in boiling H ₂ O.....	.....	54.1	.....
Ash of same.....	.....	15.57	.....

The ash consisted of Na, K, Cu, Mg, chiefly as phosphates, with some sulphates, the insoluble portion of the "black" being fine sand.

It is evident that without the most careful examination the presence of these mixtures in ground spices might often escape notice. The starch granules are usually so much altered in the process of baking as to render their identification almost impossible.

As pure ground pepper, for instance, yields:

Moisture.....	8-10
Ash.....	2-5
Starch.....	34-43
Total reducing sugar equiv.....	42-55

it is obvious that in case of admixture with this material the determination of any or all of those constituents would be of no value, and it is probable that the only reliable results would be obtained from estimating the amount of piperine and resin, which is quite constant.

Some points of similarity to other spices might be mentioned to show how admirably these mixtures are adapted to their purpose; but the object of this paper is simply to call attention to what is believed to be the latest development of inventive genius in this direction.

Soziodol Salts.

As the potassium, sodium, lithium, zinc, and mercury compounds with di-iodo-paraphenol-sulphonic acid have been now adopted to some extent in medical practice under the name "soziodol salts," the following information as to their physical and chemical properties, published by H. Trommsdorff, of Erfurt, may be of some use.

GENERAL REACTIONS.

1. *Potassium Chlorate and Hydrochloric Acid.*—It is characteristic of all the soziodol salts that upon warming them in aqueous solution with potassium chlorate and hydrochloric acid, chloranil (tetrachlorquinone) is formed, which separates in shining gold plates. As the odor of chloranil is very intense and definite, this reaction allows of the detection of soziodol even when very much diluted. But since phenol and phenolsulphonic acid behave similarly, it is necessary also to test for iodine, which can be done by the following reaction:

2. *Nitric Acid (1:4).*—All soziodol salts, upon being warmed with nitric acid, give picric acid, which separates in yellow scales, and at the same time iodine vapor is evolved. The nitric acid should be in considerable excess, and the heating continued until all the iodine is driven off.

3. *Sulphuric Acid.*—Upon heating the dry salt with concentrated sulphuric acid, iodine is immediately volatilized, and there is, at the same time, a formation of iodophenol, recognizable at once by its extremely disagreeable odor.

4. *Ferric Chloride Solution.*—All soluble soziodol salts give with a few drops of this solution an intense blue-violet color, which after a time passes to red-violet.

5. *Bromine Water.*—When bromine water is added to a soluble soziodol salt, iodine is set free and can be shaken out of the solution by means of carbon bisulphide.

6. *Barium Chloride Solution (1:20).*—All soluble soziodol salts give with this solution a strong white precipitate, which after a time changes into needles and consists of barium soziodolicum. It dissolves upon addition of ammonia, even in the cold, and also in much hot water.

7. *Silver Nitrate Solution (1:20)* gives, with the water-soluble soziodol salts, a white micro-crystalline precipitate of silver soziodol, which is also easily soluble in excess of ammonia.

8. All soziodol salts, upon being heated, give off the red-violet vapor of iodine, sometimes with and sometimes without puffing up.

TESTING OF SOZIODOL SALTS AS TO THEIR PURITY.

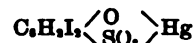
The *Potassium Soziodolicum* occurs in commerce as a fine white crystalline powder, which, upon being heated on platinum foil, puffs up in an extraordinary manner (resembling almost the so-called Pharaoh's serpents); at the same time the very disagreeable odor of iodophenol is given off. If a portion be completely incinerated, the ash dissolved in water, and first hydrochloric acid and afterwards platinic chloride added, the well-known yellow precipitate of potassium platinochloride is formed. Potassium soziodol is insoluble in alcohol, but 0.5 Gm. finely powdered dissolves in 50 C.c. of water at 15° C. by simply shaking it round; 20 C.c. of this solution, treated with 2 drops of silver solution, give a white precipitate, which should dissolve in dilute nitric acid (concentrated acid liberates some iodine). At most, immediately, not more than a quite faint opalescence should remain (traces of chlorine). If there should be a yellowish-white turbidity it would indicate that the preparation contained free iodine. This may be the case when the contents of a bottle, through frequent opening, have been allowed to get damp, to which special attention is called. If a few drops of barium chloride solution (1:20) be added to the above-mentioned potassium soziodol solution, the resulting white precipitate should dissolve completely without turbidity upon warming in water. A few drops of dilute sulphuric acid added to 10 C.c. of the above solution should give no turbidity (barium). Ammonium sulphide solution and sulphuretted hydrogen water should not render turbid a solution of 0.5 Gm. of the salt in 50 C.c. of water. Bromine water, shaken with a solution of 0.5 Gm. of the salt in 50 C.c. of water, should not cause turbidity, but only color it yellow (a milky turbidity would indicate potassium-phenol, as tribromophenol).

The *Sodium Soziodolicum* comes into commerce in white, prismatic needles, with a taste at first astringent and afterwards sweetish. One grain dissolves easily in 20 C.c. of cold water, but even in lukewarm water the solubility is essentially increased. In warm glycerin the solubility is almost the same. In hot alcohol, especially aqueous alcohol (80 per cent), it is soluble up to 5 per cent. When heated upon platinum foil it does not puff up; and the residual white fused mass gives a yellow flame when heated on a loop of platinum wire. Towards silver solution, barium chloride, dilute sulphuric acid, sulphuretted hydrogen, ammonium sulphide, and bromine water it behaves exactly like the potassium compound.

The *Lithium Soziodolicum* appears in shining white plates, which sometimes assume a faint yellowish tinge without affecting its purity. It dissolves easily in water and aqueous alcohol. The incinerated salt, heated on platinum wire, gives a carmine-red flame. Towards silver solution, barium chloride, and dilute sulphuric acid it behaves like the potassium salt.

Zincum Soziodolicum crystallizes exactly like the sodium salt, in long white needles, which sometimes, when kept for a long time, assume a very faint reddish tinge. It does not puff up when heated, and leaves a yellow powder. It dissolves in alcohol much more easily than in water. The solubility of the salt in cold water is 1:50; warm water dissolves it abundantly, about 5:100 remaining in solution after cooling. One Gm. of the salt dissolves easily in 10 Gm. of alcohol at the ordinary temperature. Towards silver solution, barium chloride, dilute sulphuric acid, and bromine water it behaves like the potassium salt. With ammonium sulphide it gives a yellowish-white precipitate.

The *Hydrargyrum Soziodolicum* appears in commerce as a deep citron-yellow, extremely fine and light powder. It is said to be sent out containing a constant proportion of 32 per cent of mercury, corresponding to the formula:

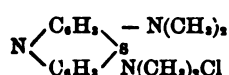


Upon being heated it puffs up like the potassium salt and volatilizes rapidly without leaving any residue. In water and in alcohol it is practically insoluble. On the other hand, 0.5 Gm. of the salt should dissolve easily when shaken in 30 C.c. of a 5-per-cent solution of sodium chloride; the solution should contain no white or yellowish-white suspended precipitate, or, at most, there should be a faint milky turbidity. If 0.5 Gm. of the salt be dissolved in 50 C.c. of water with the aid of a little nitric acid, 2 drops of silver solution added to 10 C.c. of this solution should show at most a trace of opalescence (chlorine). The solution should not be rendered turbid by 2 or 3 drops of barium chloride solution or by dilute sulphuric acid; at most there should at first be only a turbidity, disappearing on the addition of the sulphuric acid. With ammonia a solution of the salt in sodium chloride gives a yellowish-white precipitate passing into gray, and with sulphuretted hydrogen a black precipitate. The quantitative determination of the mercury may be effected by dissolving 2 Gm. of the compound in 5-per-cent sodium chloride solution, adding 1 or 2 drops of hy-

drochloric acid, and precipitating with sulphuretted hydrogen; the sulphide is then dried at 100° C. upon a tared filter.—*Pharm. Trans.*, June 21st.

Methylene Blue as an Anodyne.

THE fact that "methylene blue," a diphenylamine compound, when used in staining histological specimens, manifests a remarkable affinity for nerve tissue, and especially for the axis cylinders of the sensible and sensor nerves, suggested to Messrs. Ehrlich and Leppmann that it might prove to possess anodyne properties when introduced into the system (*Deut. med. Woch.*, June 5th, p. 493). This idea has received therapeutic confirmation in the Moabite Hospital, Berlin. It was carried out first with injections of a solution of a zinc-free compound, but a concentrated solution failed to yield a sufficient dose in the quantity thought desirable to be injected at one place (about 4 C.c. of a 2-per-cent solution), and similar negative results attended the use of a preparation of the acetate. It was therefore administered as a fine powder enclosed in gelatin capsules, containing each from 0.1 to 0.5 Gm. (1½ to 8 grains), the highest daily dose being 1 Gm. (16 grains). The rapid passage of the methylene blue into the blood, even after the smallest doses, was clearly evident, since a quarter of an hour after its internal administration or injection the urine became pale green, in two hours blue green, and in four hours dark blue, but no pathological constituents were found in the urine. A bluish coloration was also observed in the saliva and feces; but no bluish tinge of the skin, mucous membrane, or of the sclera was ever observed. It was found that in all definite forms of painful local affections—as, for instance, in all neuritic processes, and in rheumatic affections of the muscles, joints, and tendons sheaths—it acts as an anodyne. The action is, however, somewhat peculiar, in that its effect is only manifested some time after administration, usually about two hours; but when suitable internal doses of 0.1 to 0.25 Gm. (1½ to 4 grains) are administered, it goes on increasing gradually, until after a considerable interval the stage of painlessness is attained. The explanation of this slow action suggested is based upon observation of what takes place when methylene blue is injected into living nerve tissue. The coloration of the nerves that takes place immediately undergoes alteration; in the course of an hour the diffuse blue staining disappears, and instead irregular, intensely blue granules make their appearance in the axis cylinders of the nerve origins, the granules being eventually eliminated, probably mechanically, from the nerves. It is suggested, therefore, that there is a formation of an insoluble compound from the coloring substances and certain constituents of the nerve substance, which alters the chemical condition of the nerves and produces temporarily an anodyne effect. In agreement with this the action appears to be purely anodyne, and the compound produces no direct influence upon inflammatory swellings or effusions into the joints or tendons. No ill effects were observed to follow its long-continued use, and the injections are described as being almost painless. The substance used by Messrs. Ehrlich and Leppmann, and described by them as chemically pure methylene blue, free from zinc chloride, and beautifully crystalline, was probably the tetra-methyl-thionine chloride—



which crystallizes in small indigo-colored scales, with a tinge of copper or bronze on the principal surface and of cantharis green on the transverse fracture, and readily gives a 2-per-cent solution (*Annalen*, cxxx., 143). Formerly commercial "methylene blue" consisted of a double chloride of zinc and tetra-methyl-thionine, which accounts for a material free from zinc being now specified. The free "methylene blue" base—tetra-methyl-thionine hydroxide—when dried over sulphuric acid, forms a dark amorphous mass, showing a green metallic lustre when triturated; it dissolves readily with a small quantity of water to form a syrup, and is also very freely soluble in alcohol. Solutions of the chloride give with sulphuric acid a grass-green coloration, and with strong solution of caustic potash a violet-black precipitate.—*Pharm. Journ.*

Sulphocyanide as a Test for Albumin in Urine.

ACCORDING to Zuchlos, a mixture of potassium sulphocyanide and acetic acid is a more delicate test for albumin in urine than the potassium ferrocyanide and acetic acid solution, over which it also has the possible advantage of being colorless. It is prepared by mixing 10 C.c. of a 10-per-cent solution of potassium sulphocyanide with 2 C.c. of acetic acid. A few drops of this liquid, which can be kept unaltered for a considerable time, added to an albuminous urine, produces a turbidity or a precipitate according to the quantity of albumin present. Potassium sulphocyanide and succinic acid are said to act in a similar manner, and, as these can be carried about separately in the dry state, Zuchlos suggests that they would be convenient for clinical use; a mixture of the two is apt to deliquesce, but this could be avoided by enclosing it in gelatin capsules.—*Pharm. Centralh.* and *Ph. Journ.*

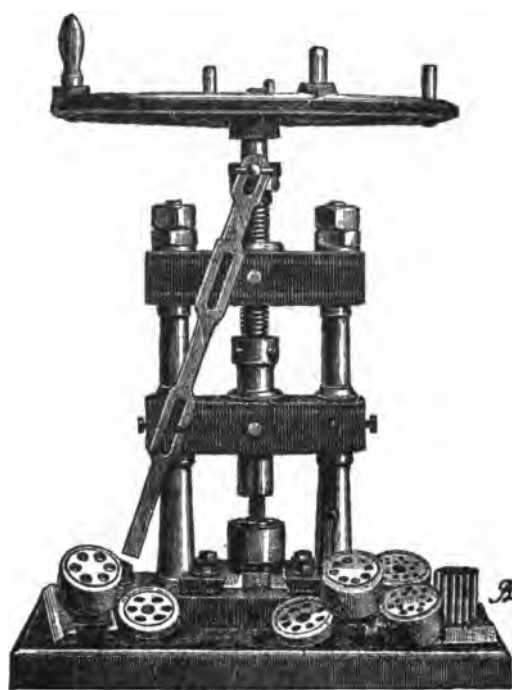
BULOW'S COMPRESSED-TABLET MACHINE.

WE give here an illustration and description of an improved tablet machine constructed by Mr. Bülow, of Goerlitz, Germany.

The frame of the press is formed of two strong wrought-iron pillars joined by two cross-pieces. The upper one of these, through which passes the screw worked by a horizontal lever wheel, is made of thick wrought iron, so as to be able to resist a strong pressure. The screw itself has a square thread, and is made to work rapidly and easily up and down. Its force is applied to a stamp guided by the lower cross-piece. At the lower end of the stamp is a central pin, which merely guides the stamp and also forces out the compressed tablets.

The novelty of this machine consists in this, that the tablets are not produced by applying the stamp or form from above upon the prepared powder, but the stamps are attached to a lower plate, travelling on rails, and the tablets are formed by the stamps entering corresponding holes in the plate or disc at the end of the screw. When compression is accomplished the covering plate is removed, and a slight extra twist of the screw causes the tablets to be pushed out above. The stamp plate is then drawn out, the tablets removed, and the plate replaced, when the same process is gone through again.

A very material advantage of this machine is an adjustable arrangement by means of which the quantity of



Bülow's Compressed-Tablet Machine.

powder required to produce the tablets, after being once accurately determined, is automatically delivered to the several forms. Experiment has shown that the difference in weight between the several tablets thus produced is not greater than when they are weighed in the ordinary way.

This machine is supplied in two sizes. Each has cylinders and stamp plates for four different sizes of tablets.—*After Pharm. Zeit.*

The Areca Nut.

A PAPER on "The Narcotics and Spices of the East," recently read by Dr. Dymock before the Anthropological Society of Bombay, contains some interesting points about the areca nut—the *supari* [this is the Hindustani name; there are many others in use.—Ed. Am. Dr.] of the natives, and the betel nut of the Europeans. Few persons, says Dr. Dymock, have any idea of the consumption of the nut in India; but, as a matter of fact, 100,000,000 people eat it every day of the year. It is well known to the natives that the fresh nuts have intoxicating properties and produce giddiness, and that the nuts from certain trees possess these properties to an unusual extent, and even retain them when dry. These intoxicating properties are much diminished by heat, and as the nuts which possess them are apt to be mixed up with the common sort, many cautious people decline to use any except the red nuts of commerce, which have all undergone a process of cooking. Dr. Dymock inclines to the opinion that the original wild nut must have been an intoxicant, especially as the unripe nuts of the best trees produce slightly intoxicating effects. The betel leaf or pan, with which natives eat the areca nut, is highly esteemed, and its thirteen properties are enumerated in the ancient books of the Hindus.—*Chem. and Drugg.*

The Constituents of Cod-Liver Oil.

M. GAUTIER and L. MOURGUES have made a detailed study of cod-liver oil and its constituents, the results of which were published in the *Journal de Pharm.* (March 1st, 1893). We give an abstract (after *Pharm. Journ.*) of the more important parts of their paper:

In operating for the separation of the alkaloidal and other principles from cod-liver oil, the authors treated 100 Kgm. of the oil methodically with an equal volume of 35-per-cent alcohol containing 3 Gm. of oxalic acid per liter. The oil was shaken with the alcohol in 20 glass bottles, each of 15 liters' capacity, the free part of which was filled with carbonic acid to avoid the action of air upon the oil. After standing, the alcoholic liquid was siphoned off, exactly neutralized with milk of lime, and evaporated *in vacuo* at a temperature not exceeding 40° C. Under these conditions the mixture remained limpid and nearly colorless. When it had been reduced to one-one-hundredth of its original volume, it was neutralized by precipitated calcium carbonate, filtered, and the desiccation finished *in vacuo*.

If it be desired simply to extract from the residue the total basic substances it contains, without regard to the manner in which they are combined, the product of the evaporation is treated with 80-per-cent alcohol, and the extract is filtered or distilled until all the alcohol is passed over, and the residue concentrated *in vacuo*. In this way a syrupy extract is obtained, to which caustic potassa is added in fragments to liberate the bases. These are separated by shaking the mixture with ether, then precipitating the bases from the ethereal solution of oxalic acid, washing the precipitate with ether, and drying. The scarcely colored dry oxalates obtained from 100 Kgm. of oil weighed 52 Gm.

In order to obtain the bases free, the salt is dissolved in the smallest quantity of water, and the solution is treated with caustic potassa. Under this treatment the alkaloids usually rise to the surface like a thick brown oil, which is due to the solution of two fixed bases in the oily bases.

The treatment with alcohol acidulated with oxalic acid removes from the oil nearly the whole of the bases. In the authors' experiments, the quantity obtained varied between 0.380 Gm. and 0.485 Gm. per kilogramme of the brown oils; but from the pale oils the yield was inappreciable, even when operating upon 10 Kgm. If account be taken of the fact that a trace of basic substances remains in the oil after treatment with acidulated alcohol, it will be seen that the total bases contained in a kilogramme of brown oil amount to about half a grain. That would be about 6.5 Mgm. of base, or 10 Mgm. of the sulphates in each tablespoonful (13 Gm.) of oil—a quantity that, considering the powerful action of these bases, cannot be without effect on the economy.

Twenty-five grammes of the mixture of oxalates dried over recently fused caustic potassa, yielded 12.5 Gm. of anhydrous bases. These were submitted to careful fractionation, first in air up to a temperature of 120° C., and then *in vacuo*. Different alkaline liquids passed over in succession, and there remained a brown magna of bases that were solid or could not be distilled without decomposition.

These were separated by converting them into hydrochlorides or platinochlorides.

After careful repetition of these operations, the bases in cod-liver oil were classified as follows:

1. Fraction boiling at 87° to 90° C., under a pressure of 770 Mm.—*butylamine*. This portion constituted about one-sixth of the total bases.

2. Fraction boiling from 90° to 100°, under the same pressure, with a fixed point 97° and 98°—*amylamine*. This fraction constituted one-third of the whole.

3. A small fraction boiling above 100° and below 115°, consisting especially of *hexylamine*.

4. Fraction boiling towards 100°, under a pressure of 600 Mm. of mercury, or at from 190° to 200° under ordinary pressure. This consists of a new base, *dihydrotoluidine*, and constituted about one-tenth of the total alkaloids.

5. The fifth portion included the fixed bases. The basic residue that could not be distilled, being treated with dilute hydrochloric acid, dissolved almost completely. This solution, which was slightly colored, gave immediately with platinic chloride a flesh-colored precipitate, alterable in light, which was separated from the mother liquor and dried upon porous porcelain. From this platinochloride a hydrochloride was prepared, from which a fixed base, named by the authors *aselline*, was obtained by precipitation with potassa.

Upon concentrating the mother liquor, a second platinochloride, much more soluble than the first and of constant composition, was deposited to the end. From this was obtained a sixth alkaloid, that constituted about one-third of the total alkaloids of the oil. This substance, which is considered by the authors to be one of the most efficacious principles in cod-liver oil, has been named *morrhaine*.

There remained in the potassic liquor, after the basic substances had been removed, the different fixed and volatile oils with which the bases were combined when

dissolved out by the acidulated alcohol. To this liquor, exhausted by ether, was now added a little sulphuric acid, and the following acids were obtained:

1. A remarkable acid, which appears, especially when the liquor is heated a little, as a brown, viscous mass, slightly soluble in water, having a disagreeable, slightly aromatic odor, recalling that of oils derived from marine algæ. It solidifies slowly in the cold and may be obtained crystalline after purification. The authors have named it *morrhucic acid*.

2. Upon distilling the acidulated liquor, after the *morrhucic acid* had been separated, there passed over a mixture of *formic* and *butyric acids*.

3. There still remained in the liquor (a) a small quantity of *morrhucic acid* in solution, removable by alcoholic ether when the solution had been evaporated; (b) a certain proportion of phosphoric acid, derived from the phosphates, phosphoglycerates, and lecithines of the oils; (c) a little sulphuric acid having the same origin.

4. These various acids having been separated, the residue was finally precipitated with subacetate of lead. After having filtered and removed the lead, strong alcohol took up an extract having a nauseous odor. In the fractions of this extract boiling towards 180° *in vacuo*, the presence of glycerin was determined by converting it into acrolein. Glycerin, therefore, accompanies phosphoric acid in the complex substances removed by alcohol from cod-liver oil, being partially combined with it; for after neutralization of the acid extract with lime, phosphoric acid again makes its appearance in the liquor if it be boiled with a mineral acid. Phosphoric acid and glycerin are in fact contained in these oils in the form of lecithines.

The foregoing, with traces of coloring matters, are the alkaline and acid constituents separable from cod-liver oil. Among them only butyric, phosphoric, and sulphuric acid had been noticed before. The special constituent which communicates to cod-liver oil the characteristic property of giving a fine violet color when treated in the cold with strong sulphuric acid, is not met with in the acidulated extract, alcoholic or aqueous.

Referring to the properties of these constituents, the authors state that *butylamine*, in sufficient dose, produces in animals fatigue, stupor, vomiting, and a certain degree of paresis; it excites the production of urine.

The *amylamine* from cod-liver oil is a very active base. In a small dose it excites the reflexes and promotes the urinary secretion. In a large dose it provokes convulsive trembling, then true convulsions and death.

Hexylamine has an action very similar to that of *amylamine*, but much less intense.

Dihydrotoluidine (C₇H₉N) occurs as a colorless oil, having a brisk, not unpleasant odor, very alkaline and slightly soluble in water, upon which it floats. It attracts carbonic acid strongly from the air. Its hydrochloride is bitter and crystallizes in very soluble, confused needles or lamellæ. The nitrate reduces silver nitrate. The yellow platinochloride is readily precipitated, but is redissolved by heat. The aurochloride, soluble in the cold, forms long needles, arranged like a fan. *Dihydrotoluidine* is a convulsive toxic base.

Aselline occurs as a non-hygroscopic, amorphous mass, with a density of 1.050. It turns yellow in air and light. When cold it is odorless; but it melts at about 100° C., and the viscous liquid has a sweetish, aromatic odor, recalling that of some ptomaines. *Aselline* is very slightly soluble in water, to which it communicates a faint bitterness and alkalinity. It is soluble in ether and especially in alcohol. The salts formed by it with acids are crystalline, but dissociate partially in water, especially when heated. In a sufficient dose *aselline* produces dyspnoea, stupor, convulsive disturbances, and with a still larger dose, death.

Morrhaine (C₁₇H₁₇N₃) is a very thick, oily liquid, with an odor recalling that of lilac or acacia flowers. It is lighter than water, in which it is slightly soluble, and is very soluble in alcohol and in ether. It is very alkaline and caustic to the tongue, and attracts a little carbonic acid from the air. The hydrochloride crystallizes in stars formed of acutely pointed needles, which are very deliquescent. The aurochloride forms a yellow precipitate. The platinochloride, which is rather soluble and alters rapidly in warm aqueous solution, crystallizes in microscopically barbed needles. The salts of *morrhaine* are not precipitated by mercuric chloride, but are by the double iodide of mercury and potassium. *Morrhaine* is a powerful stimulant of the functions of nutrition and assimilation; it produces a rapid circulation of the extractive residues of cell life towards the blood and the kidneys, where they are eliminated, provoking in this way indirectly a powerful movement of assimilation correlative of the losses consequent upon the inverse movement of de-assimilation. This is considered to have been demonstrated by the superexcitation of appetite in animals brought under its influence.

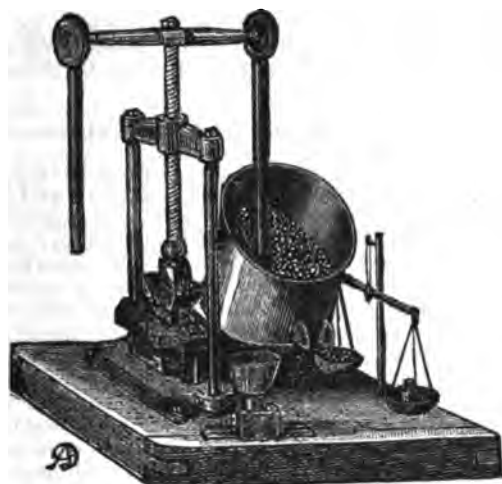
As before stated, a portion of the bases just described is combined in the oil under the form of lecithines. It is impossible, in fact, to concentrate an alcoholic extract made in presence of a mineral acid, although dilute, without the gradual deposition in the cold of a viscous acid to

which the bases were originally joined; at the same time phosphoglyceric acid makes its appearance. The lecithines do not exist in the white or slightly colored oils; neither do the alkaloids, which is considered to be another proof that these bases occur under the form of complex phosphoglyceric compounds.

While the authors' results up to this point would indicate that the brown cod-liver oils are more active, medicinally, than the light-colored ones, yet the authors distinctly state that they do not consider the undeniable reparative action of the oil to be entirely due to the alkaloids and morrhucic acid. They believe that the oil acts, first, by its fatty bodies, which are eminently assimilable, owing to their slight acidity and partial saponification, the latter being due to the influence of hepatic ferments, and to the solution, in the oil, of a certain quantity of biliary matters which render emulsification easy, especially under the influence of the pancreatic juice. These fatty bodies are energetic reconstituents of the tissues through their richness in phosphates, phosphoglyceric acid, lecithines, and originally combined phosphorus, the phosphorus being presented to the system under the form in which it exists in milk, eggs, the brain, legumin, nuclein, etc. Secondly, bromine and iodine, which are present in the oil in minute quantity (0.03 to 0.04 Gm. of iodine per liter), doubtless contribute also to its reparative action. Lastly, cod-liver oil acts by the morrhucic acid it contains as well as by its bases, several of which excite the nervous system, accelerate nutrition, and correlative augment the appetite.

A MACHINE FOR FORMING PACKAGES.

A MACHINE for forming uniform packages of powders, etc., is sometimes desirable, and the one here shown is said to be capable of delivering as many as 200 per



Machine for forming Packages.

hour. The substance to be packed is first weighed (we would advise a platform scale instead of the clumsy beam scale shown in the figure) and then placed into a paper bag, made by folding the paper about a wooden block of the desired shape, and turning down one end in the usual manner to form a bottom to the package. The block is then removed and a metallic funnel inserted, and the two are placed in the matrix of the press. The substance to be packed is then poured in and the plunger forced down by means of the screw. The rods depending from the cross-bar serve as handles and to give the proper weight to the cross-bar to keep it turning when once set in motion. The rectangular funnel and matrix can be replaced by cylindrical or other shapes, if desired, one such being shown on the bed-piece of the press.

Estimation of Quinine in Quinine Tannate.

On examining, by Orillard's method, some specimens of quinine tannate known to contain 25 to 30 per cent of the alkaloid, only about 7 to 13 per cent was found. This results partly from the imperfect extraction by alcohol of the quinine contained in the residue of the evaporation with lime, and partly from the solubility of the alkaloid in the potash employed to throw it down for weighing. The following method is proposed by S. Neumann for technical purposes; it gives results which are about 3 per cent above the truth. Two Gm. of the powdered tannate are well shaken in a stoppered cylinder with 20 to 25 C.c. of aqueous potash of spec. grav. 1.24. Care must be taken that the tannate does not adhere to the glass. Water is then added to make up to 60 to 80 C.c., and then 100 C.c. of ether, accurately measured. The cylinder is immediately closed and vigorously shaken. When the two liquids have been separated there must be no solid particles visible in either layer; 50 C.c. of the ethereal layer are taken out with a pipette and evaporated in a weighed beaker, the quinine being finally dried at 100° and weighed. An estimation can be completed in one and one-half hours.—*Zeit. anal. Chem. and J. Chem. Soc.*

NEGRE'S PILL MACHINE.

A COMPACT pill-making machine, which may be used for dispensing, is shown in the adjoining illustration. On the left is seen a cylinder into which the mass is placed, and then by means of a lever the piston is made to force the mass through a hole in a piece of metal, and thus form what is known as a "pipe." There must needs be several of these formers, with holes of different sizes. The pipe is then transferred to the cutter on the right, which resembles the pill machine in ordinary use, excepting that its grooves are segments of a circle. At the further side of the bed of the machine is a depression serving as a receptacle for the completed pills. The machine is made by H. Nègre & Co., 57 Avenue du Maine, Paris.

Colors, Hues, Tints, and Shades.

THERE are but three primary colors generally recognized—blue, red, and yellow. These are called primary because they cannot be produced by compounding any other colors. Then we have the secondaries—green, purple, and orange. These are called secondaries because blue and yellow make green; red and blue, purple; red and yellow, orange. From these we derive the tertiaries—olive, citrine, and russet. Purple and green make olive; orange and green, citrine; purple and orange, russet. Thus we have the three classifications denoting all the colors proper extant. From these are derived the hues, tints, and shades. A hue is obtained from a combination of any of the primaries. The hue



Nègre's Pill Machine.

may vary according to the predominating influence of one color over another. To obtain a "tint" we simply add white to any of these colors; and to form a "shade" we add black or any of the dark colors.

So from the above we have the alphabet of colors. The varieties of tones, tints, hues, or shades to be obtained from this alphabet are as kaleidoscopic in their possibilities as the alphabet of letters. The hand of man or the skill of the artist will never exhaust them.

We have still another term we use in relation to colors, which bears its own significance also, and that is "tone." While we have our three primaries to start from, yet we have no standard "tone" from which we shall start our secondaries. There are many different kinds of red, yellow, and blue, and we signify the difference as "tones," the same as we apply the term to different instruments of the same kind. You will say that this piano has a much better tone than that piano. So we will find in selecting our primaries. While some of the "high-toned" reds will produce a much more beautiful tint, yet they are too fugitive to use for exterior house-painting; so, too, with the greens and yellows, while some are quite permanent.—S. PARIS DAVIS (abstract) in *N. W. Builder* (and *Scient. Amer.*)

The Chemical Relationship of Cocaine and Atropine.—Alfred Einhorn has succeeded in converting *anhydroecgonine*—a derivative of ecgonine, which itself is a decomposition product of cocaine—into *tropidine*, a derivative of tropine, the decomposition product of atropine. The conversion of the former into the latter takes place under elimination of carbonic anhydride (CO₂). Einhorn believes that the conversion of cocaine into atropine will probably be accomplished in a comparatively short time. The only step still wanting is the conversion of tropidine into tropine, the only problem being to find a method of adding the elements of water to the unsaturated affinities of the tropidine nucleus.—After *Berichte*, 1890, 1338.

India-Rubber.

In these days, when local horticultural societies are formed in almost every provincial town, and when botanical and horticultural novelties attract so much attention from scientists on the one hand and cultivators on the other, the practical value of the combined efforts of both seem likely to be lost sight of. The interest attached to the successful growth or to the flowering of a rare plant, like the *Amorphophallus* at Kew last year, is equally divided between the scientific botanist and the practical horticulturist, but the introduction and successful cultivation of some valuable economic plant in countries very far distant from its native home does not secure half so much popular attention, though the benefits accruing from it to the world at large are infinitely greater and of a more lasting character. What is the production of a double flower where a single one was known before only to exist, or even the introduction to our stoves of such plants as the *Victoria regia* and the *Amorphophallus titanum*, or, if possible, the *Rafflesia* and *Welwitschia*, to the establishment in India of the cinchona plant, which has been the means of bringing that most important medicine, quinine, within the reach of all?

The result of this successful enterprise will always stand as a monument of the union of science with practice, and one of the benefits to the world in which Kew has played so large a part.

Next to this achievement, the introduction of rubber-producing plants into the various possessions of the British Empire is undoubtedly of the greatest importance. Though the whole history of these experiments has been given in the reports of the Royal Gardens, Kew, ranging between the years 1873 and 1882, it may be of some interest to point out that whereas some twenty years ago india-rubber, or caoutchouc, was known to be produced only from *Hevea brasiliensis*, then known as *Siphonia elastica*, from Pará, and from *Ficus elastica*, from Assam, the researches of the authorities at Kew have since shown that the rubber of commerce is drawn from several different plants, belonging to the natural orders Euphorbiaceæ, Urticaceæ, and Apocynaceæ—the first-named family including the Pará sort, or Hevea rubber, which is still imported in large quantities, and holds its own as the best quality, though in its native forest the trees are said to be more and more difficult to get at, as the collectors have to penetrate further each year into the more inaccessible parts. The natural consequence of this is that more attention has been given to other sources, and another Euphorbiaceous plant, the growth of which has become considerably developed of late, and which yields the rubber known in commerce as Ceara scrap (*Manihot Glaziovii*), has been introduced into Ceylon and other countries, where it has grown rapidly. This, as its name implies, is a Brazilian species, and though the rubber has been known in trade for a long time, the plant yielding it was not known till about fourteen years ago, when a consignment of plants was received at Kew, propagated, and widely distributed to India and Ceylon. The success of the plants in these countries has been recorded and fully detailed in the Kew reports before referred to; as also that of another well-known source, namely, the *Castilloa elastica*, which furnishes the bulk of the rubber from Central America, such as that known in trade as Guatemala rubber.

Mr. Morris, in his little book on "The Colony of British Honduras," gives some interesting notes on this tree, and details as to the cultivation and the extraction and preparation of rubber from it. He says:

"The tree is very abundant in some places, although daily becoming scarcer in the immediate neighborhood of settlements. It grows to the height of about forty or fifty feet, has a thick, clean stem about two feet in diameter at the base, and in habit of growth much resembles a bread-fruit tree, to which, indeed, it is closely allied. . . . The *Castilloa* rubber tree is fit to be tapped for caoutchouc, or the elastic, gummy substance produced by its milk, when about seven to ten years old. The milk is obtained at present from trees growing wild, by men called rubber gatherers, who are well acquainted with all the localities inhabited by the Toonu (under which name the plant is known in Honduras). The proper season for tapping the trees is after the autumn rains, which occur some months after the trees have ripened their fruit, and before they put forth buds for the next season. The flow of milk is most copious during the months of October, November, December, and January. The rubber gatherers commence operations on an untapped tree by reaching with a ladder, or by means of lianes or tic-tics, the upper portions of its trunk, and scoring the bark the whole length with deep cuts which extend all round. The cuts are sometimes made so as to form a series of spirals all round the tree; at other times they are shaped simply like the letter V, with a small piece of hoop iron, the blade of a cutlass, or the leaf of a palm placed in the lower angle to form a spout to lead the milk into a receptacle below. A number of trees are treated in this manner, and left to bleed for several hours. At the close of the day the rubber gatherer collects all the milk, washes it by means of water, and leaves it standing until the next morning.

He now procures a quantity of the stem of the moon plant (*Calonyction speciosum*), pounds it into a mass, and throws it into a bucket of water. After this decoction has been strained, it is added to the rubber milk in the proportion of one pint to a gallon, or until after brisk stirring the whole of the milk is coagulated. The masses of rubber floating on the surface are now strained from the liquid, kneaded into cakes, and placed under heavy weights to get rid of all watery particles. When perfectly drained and dry, the rubber cakes are fit for the market, and exported generally in casks.

"A large tree of *Castilloa*, say two feet in diameter, will yield eight gallons of milk when first cut; each gallon of milk, in the proper season, will make about two pounds of rubber. Hence a tree of this size will give a return of sixteen pounds of rubber, of the value of \$10."

Mr. Morris further refers to the use of *Castilloa* as a shade-giving tree in connection with the cultivation of bananas, cacao, Liberian coffee, oranges, etc., and records the fact that at the time he wrote, in 1883, the cacao planters in Trinidad were gradually discarding their recognized shade tree, the *Erythrina umbrosa*, and adopting others more suitable and more profitable, none of which, however, could compare with the *Castilloa*, "either in quickness of growth, in shade-giving properties, or in the return which it is likely to give the planter year after year if properly treated."

It will be sufficient to say that the plants already referred to are the principal sources of the American rubber of commerce. Quantities, however, come from India and from other parts of the East, the former from *Ficus elastica*, and the latter from various plants belonging to the Apocynaceæ, being species of *Willoughbeia*, *Louconotis*, and *Chilocarpus*; while on the east and west coasts of Africa several species of *Landolphia* yield rubber of excellent quality. A detailed account of these species, and of their distribution into various parts of the world, is given in the Kew reports before alluded to, and it forms one of the most valuable and interesting records of work done at Kew.—J. R. J. in the *Gard. Chron.*

The Future Supply of India-Rubber.

RECENT political proceedings in Brazil have brought into prominence the subject of our india-rubber imports, on which depends the success of one of our important industries. A failure in the supply of Pará rubber, whether caused by recklessly dealing with laws of exportation or natural laws in the forest, would fall heavily on many of our public and private interests. Hence it will be of interest to refer to what has been done [in England] by way of providing against any such contingency. Considering that india-rubber comes next after sugar and coffee on the list of Brazilian exports, it appears strange that till recently so little attention was given to the way in which the substance was collected. The work was left to ignorant natives, and they destroyed millions of trees either by cutting them down or by their injudicious system of tapping. Latterly, however, the province of Amazonas has passed laws to regulate the season for tapping the trees, and has awarded premiums to encourage the planting of new forests.

Some twenty years ago the importance of the question of the future supply of rubber was recognized by our government, and Mr. James Collins, of Edinburgh, was instructed by the India Office to draw up a report concerning the rubber trees of America, and to ascertain whether they could be grown in India. The results of his investigations were published in 1872. In 1875 Mr. Robert Cross, of Liverpool, in concert with Mr. C. R., Markham, of Assam, went to Panama to collect seeds and cuttings of the Central American rubber tree (*Castilloa*). He was also sent by the India Office in the following year to Pará to collect information about the Pará (*Hevea*) and Ceara (*Manihot*) trees, which produce the best rubber. The descriptions given in his official report show that he met with formidable difficulties in the course of his undertakings, but he succeeded in his main object. The seeds and cuttings which he obtained were duly sown and planted at Kew, and in due time dispersed over various botanical gardens in India and the Colonies. As trees, they are now flourishing at Madras, Calcutta, and Zanzibar, also in Burmah and Ceylon. The great superiority of the Pará rubber (*Hevea*) over all other kinds has insured for it the most attention, but, notably in Assam and Northern India, its cultivation has been very much of a failure, though not equally so in Burmah and Ceylon. It requires an equable, moist climate without extremes of temperature. The *Castilloa* tree was reported a few years ago to be doing well in Barliar and other places in Southern India. Some attempts have been made to grow the West African tree (*Landolphia*) in India. It is a hardy shrub, but takes up a good deal of room, and the quality of its products leads to some doubt whether it would pay for cultivation. From the botanical point of view we append, on the following page, a short list of plants producing india-rubber.

The trees in this list are to be met with in a broad zone parallel to the equator, where there is an isotherm of 70° F. Rubber is found as a milky fluid in the laticiferous

NAT. ORDER.	GENUS.	SPECIES.	LOCALITY.
EUPHORBIACEÆ.	HEVEA.....	<i>H. Brasiliensis.</i>	Pará.
ARTOCARPACEÆ.	MANIHOT.....	<i>M. Glasiovii</i>	Ceara.
	CASTILLOA.....	<i>C. Elastica</i>	Central America, West Indies.
APOCYNACEÆ.....	FICUS.....	<i>F. Elastica</i>	Assam, Rangoon, Java.
	HANCOORNIA.....	<i>H. Speciosa</i>	Pernambuco.
	URUCIOA.....	<i>U. Elastica</i>	Borneo.
	VARREA.....	<i>V. Gummiifera</i>	Madagascar.
	LANDOLPHIA.....	<i>Various</i>	West Africa, Mozambique.

rous vessels in the middle layer of the bark. It is coagulated by one of various methods, which include smoking over a wood fire, as in Brazil, or adding alum or a dilute acid, or by pouring the milky substance into hot water. The milk is very rarely met with in England, but we recently examined a good sample from Pará, and the proportion of rubber found in it—namely, 32 per cent—was found to agree closely with earlier analyses by Adriani and Faraday. Before bottling the milk it is necessary to add some ammonia to prevent spontaneous coagulation. The most substance comes from the lower limbs of the Pará tree, which grows to great dimensions, and may be tapped at ten years' growth, but does not for twenty years reach its maturity.

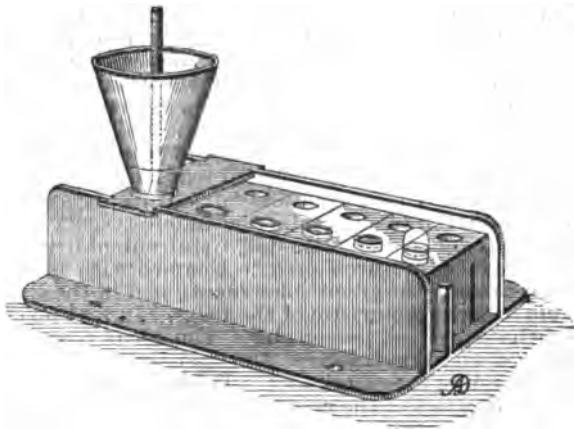
From trees as they grow in untended nature, we may turn to some of the results that have been obtained from those that have been acclimatized. A report in 1881, from Dr. King, of the Calcutta Botanical Gardens, stated that the Ceara tree was the only one that promised good results, while the Pará and the Madagascar had utterly failed. This experience has been confirmed by Sir John Kirk, consul at Zanzibar, who, in one of his official reports in 1882, said that the Ceara (Manihot) plants grew very well even in the worst soil, that they needed no attention, and that they commenced to yield rubber in five years, though not in a way to be remunerative. Nevertheless, the attempt to acclimatize American plants in Africa is an interesting one, and we cannot help wishing it an improved success, as manufacturers would be glad to receive clean rubber from Africa in place of the dirty resinous product of the Landolphias so generally imported into this country. In October, 1882, Dr. Trimen, of the Ceylon Botanical Gardens at Peradenya, sent to Kew a sample of the Central American rubber (Castilloa) produced from a cutting sent from Kew in 1876. This was examined by an expert, and reported to be of good quality, only deficient in tensile strength, owing, perhaps, to the immaturity of the tree from which it was taken. Colonial rubber is often being received at Kew, and submitted for examination, showing that this branch of economic botany is far from being neglected. Of Pará rubber from a Kew cutting, grown at Mergui, the first sample was received last season at Kew, and through the courtesy of Mr. Morris, the sub-director, we got a piece for examination. As in the above case, it was found wanting in tensile strength, and fell short of the best qualities of ordinary smoked Pará. The question is whether the excess of its viscous over its fibrous constituents will be corrected in future tappings. It is not only in acclimatizing foreign trees in India that work has been done, but, acting on Mr. Collins' report, the India Office has caused denuded districts to be replanted with the indigenous *Ficus elastica*. Already in 1870 there was a plantation of these trees at Chardnar, in the district of Darrang, which covered a space of eighty square miles. This particular area has since been annually increased, and there has been planting in other districts besides. We may feel assured that the wanton destruction of rubber trees has practically ceased, and that the importance of securing an adequate supply of rubber for our future needs is fully recognized.

The financial side of the question can hardly be discussed till more reliable data have come to hand, but they are hardly likely to prove that undertakings in forestry bring any immediate or very early return. Dr. Trimen, for his part, feels confident that produce from Ceara trees will furnish an important item of revenue to Ceylon. It must be added that, in view of the competition in the case, other interested parties are not so sanguine of commercial success as he is.—*Industries.*

The British Unofficial Formulary.—The recent additions made by the committee appointed by the British Pharmaceutical Conference number but nine: Acidum hydrocyanicum (Scheele), A. hypophosphoricum, Chloroformum Aconiti, Chloroformum Belladonnæ, Chloroformum camphoratum, Elixir Sennæ, Extractum Hæmatoxyli liquidum, Syrupus Calcii Hypophosphitis, Syrupus Sodii Hypophosphitis. The first is calculated to insure greater uniformity in strength than the Scheele's acid of commerce is credited with. The formula for hypophosphorous acid is introduced on account of the differences in products of the best makers. Of the three chloroform formulæ, the third is a simple solution, and in the other the solvent action is assisted by strong solution of ammonia.—*Lancet.*

A CAPSULE FILLER.

AN apparatus devised for facilitating the filling of empty capsules is made by the Acme Capsule-Filler Company, of Washington, D. C. The *Druggists' Bulletin*, from which we take our illustration, does not afford a very lucid description of the machine, but, so far as we can comprehend, it seems to consist of a metallic base, with a cross-bar supporting a funnel. Through the length of the machine passes a wooden portion, made with openings into which fit the various sizes of capsules in the market; there being several of the wooden slides with each machine. Running lengthwise is also a metallic strip, the upper edge of which is curved, so that as the wooden slide is moved towards the funnel the capsules are made to rise from the slide sufficiently to receive the cap. To operate it, a slide adapted for the size of capsules to be filled is charged with empty shells, the covers being removed. The slide is then put into place and pushed along until the first hole comes under the funnel (as indicated by the groove in the upper surface of the slide coming even with the outer margin of the funnel support). The funnel is then screwed down until it fits the top of the slide but still allows it to move. The powder is then placed in the funnel, and if necessary packed into the capsule with a rammer. As the capsule first filled arrives at the position shown in the illustration, it is capped and lifted from the slide, and the slide is moved again from left to right until all the capsules have been capped and removed.



"Acme" Capsule Filler.

Kaolin and its Source.

KAOLIN, which is so useful an article, even in pharmacy, as an insoluble and inert substance suitable as filtering material, or in making pills of permanganate or other oxidizing agents, is a silicate of aluminium. In some places it occurs almost in a pure state. But generally it is found in combination with other products of the decomposition of granite. How the latter has become decomposed is not known, but it is supposed to be due to atmospheric influences. An important kaolin mine exists in the southern part of the Department de l'Allier (France), where a fine-grained granite has, over a large area, been changed to a mixture of silica, alkaline silicates, and silicate of aluminium, all derived from the felspar of the granite. This deposit is worked on a large scale, the only agent used for separating the constituents being water, which is made to pass, mixed with the mined material, through a series of vats, channels, and sluices, in which the coarser and heavier particles are successively deposited, while the finer kaolin remains suspended in the water and is finally deposited in large tanks. When thoroughly washed and dried it is ready for shipment, being chiefly used in the manufacture of porcelain, ultramarine, and paper.

Even the best kaolin is not absolutely white, but has a more or less faint yellowish tint. This is overcome by mixing with the last water a very small quantity of methylene blue or Lauth's violet, which destroys the yellow tint.—*After Zeitsch. f. angew. Chem.*

Biblical units have the following equivalents: A shekel of gold was \$8. A firkin was seven pints. A talent of gold was \$13,809. A talent of silver was \$538.30. Ezekiel's reed was nearly 11 feet. A cubit was nearly 22 inches. A bin was 1 gallon and 2 pints. A mite was less than a quarter of a glass. A shekel of silver was about 50 cents. A piece of silver, or a penny, was 12 cents. A Sabbath day's journey was about an English mile. An ephah, or bath, contained 7 gallons and 5 pints. A day's journey was about 23 miles. A hand's breadth was equal to 3½ inches. A finger's breadth was equal to 1 inch. A farthing was 7 cents.

Asafoetida in Tears.

THE peddling character of the drug trade, as compared with other branches of the produce business, is a matter of frequent comment. It is, however, precisely from this characteristic that the drug business derives an amount of interest which must be totally lacking in transactions in such large articles as coffee, sugar, or tea, and which frequently causes an apparently inordinate amount of time to be devoted to consignments of goods of comparatively insignificant intrinsic value. Such a parcel of merchandise, imported from Bombay, was offered at last week's drug auctions. The whole of it weighed less than a ton, and the price which it realized was rather below £50, yet no other lot in the sale was watched with greater curiosity. The parcel to which we refer consisted of eight cases of a drug which the importers believed to be gum ammoniacum, while the dock authorities had cleared it under the name of *asafoetida*, and which the selling broker, to be quite safe, sold as "gum" pure and simple. Among the audience opinions were divided, but most of those who expressed themselves gave it as their belief that the article consisted of a mixture of *asafoetida* and ammoniacum, with a large proportion of seeds of the latter drug. Ultimately the lots were disposed of to three or four buyers, who, we should think, will have no reason to regret their bargain. A careful examination of a sample which we secured showed that the parcel consisted entirely of genuine *asafoetida* of the finest description, intermixed with an unusually small proportion of such earthy impurities and seed as would unavoidably be collected along with the gum-resin itself. The sample examined by us showed loose tears of irregular shape, varying in size from a pea to a large walnut, of a pale orange to light brown color, and rather less pronounced odor than that of the *asafoetida* usually met with in the market. Fractured, the tears showed the usual characteristics of fine *asafoetida*, the surface being opaque and of a milk-white color, while the taste proved all that it should be—viz., acrid and alliaceous in the highest degree. It was observed that the fractured tears when exposed to the air did not redden so quickly or so deeply as does the usual commercial *asafoetida*, and in one respect the drug did not answer to the orthodox requirements, inasmuch as the freshly fractured surface touched with nitric acid did not assume the green color mentioned in the Pharmacopoeia as a characteristic of the tears. In fact no coloration whatever was perceptible. The seeds found in the sample were round, hairy, and had two or three vittæ only extending longitudinally. The hairiness of the seeds at once disposed of the assertion that they were seeds of *Dorema Ammoniacum*. Neither were they the seeds of the *Ferula Narthex*, for the latter are oblong and possess at least four vittæ. They belong, in fact, to *Ferula foetida*, one of the plants from which the *asafoetida* of commerce is derived. A considerable amount of confusion has always prevailed with regard to the exact botanical origin of *asafoetida*, and although the researches of some recent travellers—notably Dr. J. E. Aitchison, who, a few years ago, as a member of the Afghan Frontier Commission, traversed a great part of the region producing the drug—have helped to shed a good deal of light on the subject, much remains to be cleared up. According to Mr. E. M. Holmes, who ascertained the botanical source of the sample here referred to, the *asafoetida* plants may be divided into two groups, the first and most important of which includes the three varieties which yield the bulk of the gum-resin met with in commerce—viz.: *Ferula Narthex*, Boiss. (syn.: *Narthex Asafoetida*, Falc.); *F. foetida* (syn.: *Scorodoma foetidum*); and *F. foetidissima*, Regel and Schmalh. The second group comprises the *F. alliacea*, Boiss., which is believed by Dr. Dymock to be the source of the dark-colored "hing" largely used as a condiment throughout India and the adjacent countries, but never met with in European commerce.

The *asafoetida* region is thought to include not only the whole of Southern and Eastern Persia, but also the greater part of Beloochistan and Afghanistan, Turkestan, and the region, now under Russian control, eastward of the Sea of Aral. It is, we believe, cultivated in the Punjab also, and the bulk of it, at any rate, is brought into commerce via Bombay, where it is received either by way of the Persian Gulf or through British India. The proportion of the drug consumed in the East is enormously larger than that shipped to Western countries. We find, from the statistical tables of the trade of British India which have just been issued, that whereas the total imports of *asafoetida* into that country during the last five years have been 37,306 cwt., the aggregate exports have only been 2,014 cwt., or barely 5 per cent of the whole. The first trustworthy account of the collection of *asafoetida* in Persia was given about two hundred years ago by one Engelbert Kaempfer, a German scientist; but, from the reports of recent visitors who have observed the mode of collection of the drug, this still remains the same in all essential particulars as in Kaempfer's time. According to that authority the collection begins about the middle of April, when the earth is removed from the roots, which vary in thickness from a carrot to that of a man's leg, and the leaves of the plant are removed. Toward the end of May the top of the root is sliced away, and the

juice exudes and is scraped off. A few days later another incision is made, and this process is repeated at intervals until the beginning of July, when the crop is at an end. It has been asserted that the usual *asafoetida* of commerce in the agglutinated tears is that which exudes from the root when the whole top is sliced off, while the tears are the solidified juice obtained from incisions only. It has also been suggested that the agglutinated tears were the product of a different variety of the plant than that which yielded the free drops. However this may be, it is certain that the loose tear of *asafoetida* is very rarely met with in our markets. Some few years ago a small parcel of what was believed to be tear *asafoetida* was offered at the London drug auctions, and sold with some competition at about 50s. per cwt. The tears, which were round or oval in shape, and about one and one-half inches in diameter, proved to be pebbles of talc which had been coated with true drug, probably by dipping them in liquid *asafoetida*. The amount of true *asafoetida* was not over 5 per cent. Whether the fraud was practised by the same expert hands which sent us the spurious benzoin referred to in our last issue we cannot say; certain it is that both parcels came to us from Bombay.—*Chem. and Drugg.*

Naphtalin and its Tests.*

NAPHTALIN appears in form of white crystalline laminae, of a tarry odor, of spec. grav. 1.15, melting at 80° C., and boiling at 217° C. It sublimes easily. In water it is almost insoluble; easily soluble in alcohol, benzol, toluol, and ether; only slightly in ligroin; 100 parts of absolute alcohol, at 15° C., dissolve 5.29 parts of naphtalin; 100 parts of toluol, at 16.4° C., dissolve 31.94 parts. When boiled with water, it is carried over by the steam.

When oxidized by diluted nitric acid (spec. grav. 1.13), naphtalin yields phthalic acid (about 40 per cent of the theoretical quantity). With chromic and glacial acetic acid it yields alpha-naphtochinon; with chromium chloride it yields dichloronaphtochinon. When oxidized with manganic oxide and sulphuric acid, it furnishes dinaphtyl and phthalic acid.

Treatment with fuming nitric, or with a mixture of concentrated nitric and sulphuric acids, converts it into nitro-substitution products.

Chlorine made to act upon it produces both addition and substitution products, but bromine only substitution products.

Concentrated sulphuric acid converts naphtalin into mono- or disulphonic acids or into sulphones, the effect depending upon the quantity or concentration of the acid, or upon the temperature.

On stirring for some time a mixture of naphtalin and about 20 parts of fuming nitric acid, washing the resulting nitro-product, and then transferring it to a boiling aqueous solution of equal parts of potassa (KHO) and potassium sulphide, the liquid gradually acquires a handsome violet-blue color (Vohl).

Some nitro-compounds combine with naphtalin, forming needle-shaped crystals.

The following tests may be applied to determine the purity of commercial naphtalin:

It should be white, and not become dark colored when brought in contact with concentrated sulphuric acid. Melted naphtalin should congeal at 80° C. It should boil at 217° C., leave no residue on heating, and should prove to be free from phenols and chinoline bases.

Phenols are detected as follows: Boil 1 or 2 Gm. of the naphtalin with 30 C.c. of a dilute soda solution, allow to cool, filter from the remaining naphtalin, and add to the filtrate some bromine water and hydrochloric acid. If phenols are present, a turbidity or (if a considerable amount is present) a precipitate of bromo-phenols will make its appearance.

Chinoline bases are detected by dissolving the naphtalin in concentrated sulphuric acid, pouring the solution into water, filtering, rendering the filtrate alkaline, and distilling. The chinoline bases pass over with the steam, and may be recognized by their odor.

If about 1.5 Gm. of antimony trichloride is heated a little beyond its melting point in a small porcelain crucible, and a little crude naphtalin put upon the inner edge of the crucible, carmine streaks will appear where the melted masses run together. Chemically pure naphtalin produces no such colored streaks. On cooling, shining, rhombic plates are formed. Anthracene and phenanthrene, under the same circumstances, yield a faintly greenish tint.

On dissolving naphtalin in chloroform, adding aluminium chloride, and warming, the liquid turns greenish-blue. This tint appears immediately only when the aluminium chloride was absolutely dry. If the least trace of moisture is present, the tint does not appear until after about half an hour.

Lysol is a new rival to creolin and carbolic acid in the disinfectant line. It is of the consistence of soft soap, and is made from coal tar, with fatty and resin soaps. It does not contain phenol.—*Chem. and Drugg.*

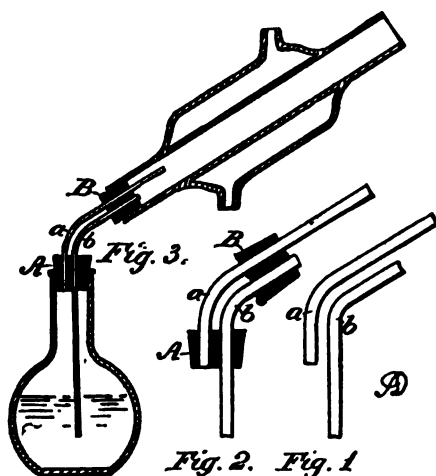
* Chiefly after G. Vortmann, "Anleitung zur Chem. Analyse Organischer Stoffe," 8vo. Leipzig and Wien, 1889.

A CONVENIENT ATTACHMENT FOR A REVERSED CONDENSER.

J. L. BEESON describes the improved attachment, here illustrated, in the *Scient. Amer. Suppl.* No. 754:

In using a reverse condenser, where considerable quantities of gas must pass out from the upper end of the condenser—as in the case of the preparation of monochloroacetic acid by passing chlorine gas through boiling acetic acid, when considerable quantities of HCl and chlorine gases escape—if the heat is not very carefully regulated it often occurs that the flow of the condensed liquid is obstructed by passage of the gases and vapor into the condenser, and it accumulates until the tension of the vapor in the flask and the exit of the gases spurt it out. The following device I find to entirely prevent the trouble. It will be found to work to great advantage with a reversed condenser where no gases are escaping, as the heat will need no adjustment, and the operation, when started, will need no attention whatever.

Bend two small glass tubes as represented in *a* and *b*, Fig. 1. Pass these through the large rubber stopper, *B*, for flask, and the small one, *A*, for end of condenser, as represented in Fig. 2. Let *b* pass just through *A*, but far enough through *B* to reach below the surface of liquid in the flask. Let *a* pass just through *B*, but far enough through *A* to reach within an inch of where the water bath begins, as represented in Fig. 3. Tube *a* must not touch the condensing tube, especially on the bottom, as the condensed liquid would flow back into it.



Beeson's Condenser.

The hot vapor and gases will pass out through *a*, since *b* dips below the surface of the liquid, and will condense above the end of *a*, as it does not reach the water bath in the condenser, and will flow back through *b* into the flask. The lower part of the condenser will not become cool enough to condense the outflowing vapor in *a*, nor hot enough to vaporize the backflowing condensed liquid; so we have a steady stream of vapor, or vapor and gas, flowing out through *a*, and a steady stream of condensed liquid flowing back into the flask through *b*.

A NEW AND IMPROVED EXTRACTION APPARATUS.

RECENT fat determinations which required to be made in the shortest possible time and with reliable results, have given me an opportunity to test the apparatus here described.

The extractors hitherto in use did not answer my purpose, being either too complicated or requiring a long time for completing the extraction. The chief advantage of the new apparatus (Kenther's) is this, that it yields equally good results in one-fourth the time required by other extractors. A very convenient feature also is a stopcock attached to the apparatus, by means of which the progress of extraction may at any moment be tested, while a simple turn of the same stopcock, when the extraction is completed, will enable the operator to distil off the volatile menstruum from the flask. The apparatus may be used for every kind of extraction—fat, oil, powder, etc.—with equally good results.

The apparatus consists of an extractor proper, *A*, which is intended to receive the substance to be extracted, either directly or by means of a funnel, cartridge, or weighing-glass, *G*, the perforated bottom of which is covered with filtering paper, upon which is then placed any suitable quantity of the substance.

The liquid which percolates through the substance runs off through *B*. *C* is a siphon tube provided with a stopcock. *D* is a tube conveying the hot vapor. *F* is a filter lining, which may consist of linen, filtering paper, felt, cotton, or other porous material.

When the apparatus is to be used, the following method is the best:

First weigh the extraction flask, then pour into it the requisite amount of alcohol (or ether, or other volatile liquid), connect the flask with the extractor, cautiously introduce into the latter the substance to be extracted, which has been carefully weighed, connect the apparatus with the condenser, fasten the apparatus to a holder, and place below it a water bath with burner.

If it is now desired to ascertain how much time is required for exhausting a certain quantity, the stopcock attached to the siphon tube is opened, a drop of the liquid received upon platinum foil or a watch glass, and notice taken whether there is any residue.

When the apparatus is put together, care should be taken to adjust the tube *C* in such a manner that the orifice in it is not too far from the outlet, so that only a slight rotation will be required to open or shut the outlet.

When the extraction is completed, the stopcock is opened, and the alcohol, ether, etc., received in a separate flask. Of course, when the stopcock is opened the extraction is interrupted, and the vaporized alcohol, etc., reaches the outlet pure. When the distillation is completed, the extraction flask is disconnected, carefully wiped off, put into a drying oven for a short time, then allowed to become cold in an exsiccator, and finally weighed. The employment of this apparatus saves much time and yields very exact results. A complete determination of fat in milk, from the moment when the cartridge is placed in, to the last weighing of the flask, required only forty minutes.

It may be added that all parts are carefully fitted together by grinding.

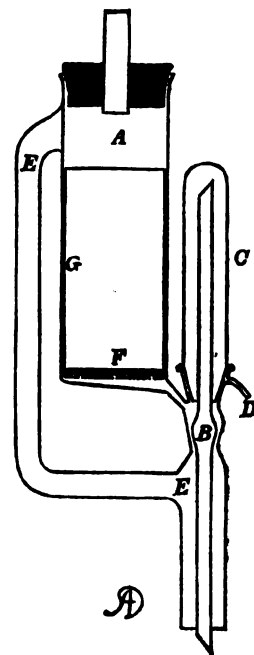
W. MUELLER, Apotheker.

BRUNNSCHWEIG.

Note on Manna.

FROM a paper on "Manna-yielding Plants," by J. R. Jackson, Curator of the Kew Museum, printed in the *Chem. and Drugg.* (June 28th), we take the following introductory portion.

What is generally understood by the term *Manna* is a sweet exudation from the stems of the manna ash (*Fraxinus Ornus*, L.), a small tree found in Italy, and extending into Switzerland, the Southern Tyrol, Hungary, Greece, Turkey, and other places. In England the tree is also grown for its ornamental character, but there it grows to a height of 30 feet or more. No manna is collected from the English-grown trees. It is from Sicily that the bulk of the manna of commerce is at the present time obtained, the plants being regularly cultivated in plantations in certain localities within twenty-five miles of Palermo on the west, and within fifty to seventy miles on the east. The trees, which are here planted in rows, grow to a height of from 10 to 20 feet, and are about 7 feet apart. A manna-ash plantation is kept free from weeds, the ground is loosened and is occasionally enriched with manure. At the age of eight years the stems have attained a diameter of about 3 inches, and the manna is then drawn from them by making incisions through the bark to the wood from 1 inch to 2 inches long, and at a distance from each other of about 1 inch. The first cut is made at the lower part of the trunk, and the next day another is made just above it, and this is continued daily during the dry weather, after which the tree is left alone until the following season, when the untouched part of the stem is operated upon in the same way, and similar practice is continued in succeeding years till the tree is exhausted, which is usually at the age of ten or twelve years, when the stem is cut off, and another shoots up from the same stump—indeed, several stems are often to be seen growing from the same root. The very finest manna is that which has become encrusted around pieces of stick or straws placed in the incisions in the stems to receive it; but the fine quality ordinarily seen in commerce, and known as flake manna, is that which has hardened on the stem. The inferior qualities are those which flow from the lower incision, and are either collected on tiles or in the hollow of boat-shaped joints of a species of *Opuntia*. After removal from the tree the manna is laid upon shelves to dry or harden before packing. The best manna harvests are obtained in warm, dry weather, usually in the months of July and August, when the trees have fully matured their leaves.



Mueller's Extractor.

For Writing on Zinc a German chemist recommends Liq. antim. chlor. The zinc should first be treated with dilute sulphuric acid, and then write with an ordinary steel pen.

On the Formation of Hydrogen Peroxide from Ether.

AUTHORITIES have hitherto made very conflicting statements regarding the production of hydrogen peroxide (by some even supposed to be ozone) from ether, there being no definite knowledge as to the conditions under which it is produced. Prof. W. R. Dunstan and Mr. T. S. Dymond, who had partly investigated this subject before, have now made a new study of it, and have ascertained under what conditions the formation takes place. We give an abstract of their paper from the *Journ. Chem. Soc.*, 1890, 574.

The results of this second series of experiments now to be described leave no room for doubt that pure ether does not form hydrogen peroxide when exposed to light and air in presence either of water or of diluted sulphuric acid.

Three different specimens of ether were subjected to the action of daylight. They had been prepared and purified in the following manner:

Ether prepared by the reaction, under pressure, of excess of sodium ethoxide with ethyl iodide. The product was thoroughly washed with water, dried, and distilled.

Ether prepared by the reaction of alcohol and sulphuric acid, purchased as "pure ether," was further purified by agitating it successively with a small quantity of sulphuric acid, potash solution, and water. After having been dried over solid potash it was distilled.

Ether prepared from methylated spirit was purified in exactly the same manner as the previous specimen.

Of the three specimens thus prepared and purified, the first two did not in the least affect a 1-per-cent solution of potassium iodide or react with dilute chromic acid. The third specimen afforded a very pale yellow color with dilute potassium iodide, which was somewhat intensified by the addition of very dilute sulphuric acid; but it did not afford evidence of the slightest trace of hydrogen peroxide when tested with chromic acid.

We have ascertained the delicacy of the characteristic reaction of hydrogen peroxide with chromic acid, and have compared its delicacy with the potassium iodide reaction. Twenty C.c. of a solution containing 0.00125 Gm. of hydrogen peroxide in 100 C.c. of the liquid were mixed with a few drops of a dilute solution of chromic acid (prepared by the addition of dilute sulphuric acid to a 1-per-cent solution of potassium dichromate) and shaken with 20 C.c. of ether. The ether separated from the liquid of a pale-blue color, distinctly recognizable. With more dilute solutions the blue color was only indistinctly seen. The reaction is thus shown to be capable of revealing the presence of 0.00025 Gm. of hydrogen peroxide.

In testing ether for hydrogen peroxide, care has to be taken not to add a large excess of chromic acid, since this seriously impairs the delicacy of the reaction. One or two drops of the 1-per-cent solution of potassium dichromate, acidified with dilute sulphuric acid, should be added to about 20 C.c. of water, and the liquid shaken with about an equal volume of the ether. If the yellow color of the aqueous liquid disappears, a little more of the chromic acid must be added. It is important to observe that the *ethereal layer* which separates is blue, and *not merely the aqueous liquid*, since the presence in the ether of an easily oxidizable substance will lead to the reduction of the chromic acid and to the formation of a greenish-blue solution of a chromium salt. Twenty cubic centimeters of the solution in which the hydrogen peroxide had been recognized by the reaction with chromic acid were now mixed with an equal volume of ether and the same quantity of a 1-per-cent solution of potassium iodide. After a few seconds a pale-yellow color was observed, which deepened on the addition of dilute sulphuric acid. The chromic reaction for hydrogen peroxide is more satisfactory than that with potassium iodide, since it is instantaneous; a dilute neutral solution of hydrogen peroxide acts only very slowly on a solution of potassium iodide; and acidified potassium iodide, although it reacts more rapidly, cannot, under the present circumstances, be relied on as a test for hydrogen peroxide, since certain organic compounds are attacked by hydriodic acid.

[The authors next exposed specimens of the three ethers for a long time both to daylight and to the electric light. The effect will be seen from the following.]

The ether prepared from ethyl iodide did not react with potassium iodide, hydriodic acid, or with chromic acid.

The ether prepared from methylated spirit contained an increased amount of hydrogen peroxide.

The ether prepared from alcohol and purified with sulphuric acid and potash reacted faintly with potassium iodide, and decidedly with hydriodic acid, but not with chromic acid. These three specimens had now been exposed to daylight for five months, and during two months to the electric light for three hours nightly, but no hydrogen peroxide had formed in those derived from ethyl iodide and from alcohol; that prepared from methylated spirit alone contained hydrogen peroxide. With respect to the other specially purified specimens, in no case had hydrogen peroxide been formed, neither had it formed in the acidulated water. It is therefore proved that the substance capable of yielding hydrogen peroxide may be removed from impure ether by the action either of hydriodic acid or of chromic acid. It is also proved that the

addition of dilute sulphuric acid to pure ether does not promote the formation of hydrogen peroxide, and that this substance is not produced when oxygen and dilute sulphuric acid are exposed to light.

We consider that the results now recorded conclusively demonstrate that the hydrogen peroxide cannot be formed from purified ether by exposing it to light, under ordinary atmospheric conditions, in contact with air and water. The results recorded by former observers must have been due to the employment of impure ether. Since some of these observers appear to have worked with what is ordinarily known as "pure ether," which presumably is not prepared from methylated spirit, it would seem that occasionally ether prepared from alcohol, if not purified in the manner we have described, is liable to contain a substance which develops hydrogen peroxide.

We have not been able to ascertain the nature of this impurity, owing to the circumstance that it is present, together with other substances, in very small quantity. Of the impure specimens of ether we have examined, that which was richest in hydrogen peroxide had been exposed for many years to light. It contained only 0.04 per cent of hydrogen peroxide, as determined by its iodine-liberating power in acid solution.

Hydrogen Peroxide produced by the Slow Combustion of Ether.—It is well known that when ether is heated, with a limited supply of air, a pungent, highly irritating substance is produced which has been called "lampic acid." Legler (*Ber.*, 14, 602; *Annalen*, 217, 381) has investigated the nature of the products formed under these circumstances. He obtained, besides formic aldehyde and other compounds, a crystalline substance to which he assigned the formula $C_{11}H_{12}O_{11}$. It possesses oxidizing properties, but it is doubtful whether Legler actually obtained hydrogen peroxide from its decomposition, and apparently he did not find the substance among the products of the combustion. Perkins (*Trans.*, 1882, 363) has drawn attention to the character of the flame which is observed when ether undergoes this change, and he mentions that aldehyde is formed, but no allusion is made to hydrogen peroxide.

In our first experiments on this point, air was drawn through pure ether slightly warmed, and the air charged with ether vapor was passed into a tube containing pumice heated to low redness. A lambent flame or glow was observed within the tube. The escaping vapors were condensed in cold water. This aqueous liquid, which possessed a highly pungent odor and taste, contained no hydrogen peroxide; it did not react either with potassium iodide or with chromic acid. Aldehyde and acetic acid were the chief products of the action. Other experiments were made with oxygen instead of air, and the same result was obtained. Further observations were made with a form of apparatus in which opportunity was afforded for the immediate condensation of any hydrogen peroxide that might be formed. About 50 C.c. of pure ether were placed in a large flask, together with about the same quantity of water. A glass rod heated to low redness was repeatedly introduced into the upper part of the flask, so that it locally heated the air immediately above the liquid. The contents of the flask were agitated from time to time, so that any hydrogen peroxide that might be formed would be dissolved by the cold water. This process was continued until nearly the whole of the ether had disappeared. The remaining liquid contained much hydrogen peroxide, it liberated iodine from potassium iodide, and afforded a fine blue color with chromic acid. It was found that the most convenient form of apparatus for producing hydrogen peroxide by the slow combustion of ether consists of a modified (Döbereiner's) lamp, to which fresh supplies of air could be constantly admitted. A large flask, containing enough ether to cover the bottom and about an equal quantity of water, is connected with a wash bottle containing cold water. Through the cork of the flask there passes a wide tube, open at both ends, through which air is admitted, a spiral of stout platinum wire, and an elbow tube which is joined to the wash bottle. By means of an aspirator connected with this bottle, a current of air is drawn through the wide tube into the flask. The spirit is heated to redness and plunged into the flask, the current of air being so regulated that the platinum is maintained at a low red heat. From time to time the flask is shaken. Hydrogen peroxide is continuously formed, and when the ether has nearly disappeared a considerable quantity will be found in the remaining water, while some can be detected in the water of the wash bottle. In this process of oxidation, although the oxygen of the air is almost entirely consumed, little or no carbon dioxide is produced. The simplest interpretation of the change appears to be that the reaction is similar to that which occurs when ozone reacts with ether in presence of water. At a low red heat the ether forms a peroxidized product which is decomposed by water, with the production of hydrogen peroxide. It seems to be unnecessary to suppose that the atmospheric oxygen is actually ozonized before it peroxidizes the ether. The alternative hypothesis is that under the condition of the experiment water is directly oxidized, but there is no experimental justification for this view. We find that neither water nor dilute sulphuric acid forms hydrogen peroxide when heated with air in the manner above de-

scribed, and we have likewise failed to observe its formation during the evaporation of water in air.

We have not been able to form hydrogen peroxide by the slow combustion of acetone, alcohol, ethylene, or coal gas.

Summary.—Hydrogen peroxide is not formed when pure ether is exposed to light in contact with air, either in presence or absence of water.

Some specimens of ether, notably those prepared from methylated spirit, develop hydrogen peroxide when kept, unless they have been previously purified by repeated treatment with dilute chromic acid.

Ozone reacts with pure ether, and the product, when mixed with water, yields hydrogen peroxide.

The imperfect oxidation of pure ether effected by locally heating it in air leads, when water is present, to the production of hydrogen peroxide.

Hydrogen peroxide is not formed by the action of light on water and oxygen, even in presence of dilute sulphuric acid; neither is it produced under similar conditions when the oxygen or the water is heated.

Clove Culture in Zanzibar.

UNITED STATES CONSUL PRATT, of Zanzibar, writes as follows to the Department of State: Zanzibar is noted for being the principal source of the world's supply of cloves, and a report on the cultivation of this article of domestic economy may prove of interest.

When speaking of Zanzibar, we include the islands of Zanzibar and Pemba, three-fourths of the entire crop of cloves being produced in Pemba. Those grown on the island of Zanzibar are reckoned of superior quality and command the better price, but this is probably due to the fact that the owners reside here and can thus give their affairs the benefit of direct supervision. Certainly the conditions for their successful cultivation are most favorable at Pemba, where the rainfall exceeds that of Zanzibar; but the management being left to careless overseers, the result is the cloves being imperfectly cured and (but little care being observed in handling) are frequently marketed in an inferior condition.

The clove tree was first introduced into Zanzibar by the then sultan, Sayed Said bin Sultan, about the year 1830, since which time its cultivation has gradually extended, until now it is the chief industry of the islands. The industry received a check in 1872, the date of the great hurricane. At least nine-tenths of the trees were destroyed at that time, so the larger part of those now standing are of new growth. A peculiarity of the clove tree is that every part is aromatic, but the greatest strength is found in the bud, which is the "clove" of commerce. The finest quality of cloves is dark-brown in color, with full, perfect heads, free from moisture.

In the cultivation of the clove the first thing to be done is the starting of the shoot. The seeds are planted in long trenches and are kept well watered until after sprouting. In the course of forty days the shoots appear above ground. They are carefully watered and looked after for the space of two years, when they should be about three feet in height. They are then transplanted, being set about thirty feet apart, and are kept watered until they become well rooted. From this time on, the young trees require only ordinary care, though the best results are obtained when the ground about the trees is well worked over and kept free from weeds. The growth of the trees is very slow, and five or six years are required for it to come into bearing, at which time it is about the size of an ordinary pear tree and is usually very shapely. It is a pretty sight to see a young plantation just coming into bearing. The leaves, of various shades of green tinged with red, serve to set off the clusters of dull-red clove buds.

As soon as the buds are fully formed and assume this reddish color, the harvesting commences and is prosecuted for fully six months at intervals, since the buds do not form simultaneously, but at odd times throughout the said period. The limbs of the tree being very brittle, a peculiar four-sided ladder is brought into requisition, and the harvesting proceeds apace. As fast as collected the buds are spread out in the sun until they assume a brownish color, when they are put in the storehouse and are ready for market. A ten-year-old plantation should produce an average of twenty pounds of cloves to a tree. Trees of twenty years frequently produce upwards of one hundred pounds each.

The present season, commencing with July, 1889, is very favorable, and the crop will exceed that of any previous season. It will, in all probability, amount to 13,000,000 pounds, averaging a local value of ten cents per pound. The sultan derives no inconsiderable portion of his revenue from this source, since the duty is levied at 30 per cent *ad valorem*, thus placing to the sultan's credit for the present year nearly, if not quite, \$400,000.

Besides the clove buds the stems are also gathered, and form an article of commerce, commanding about one-fifth the price of cloves and having about the same percentage of strength. To this circumstance is due the fact that ground cloves can be purchased in the home market at a lower price than whole cloves.

For the past fifteen years the cultivation of cloves has been the chief occupation of the Arab planters, and had always netted good returns. It seems probable that it will continue to be a profitable crop, since the consumption of the article appears to keep pace with the inevitable increase of production. Up to the present time the plantations have been worked with slave labor and at comparatively small expense; but with stoppage of slave supplies from the mainland great difficulty will be experienced by the planters during harvest time. One result will be an increase of expenses; but what the planters have most to fear is that the curtailment of the labor supply would entail a direct loss by rendering it impossible to harvest the crop until after it had blossomed, when it would be unfit for the uses of commerce.

The Manufacture of Anhydrous Sulphuric Acid.

ANHYDROUS sulphuric acid is now made on the manufacturing scale in the Malétra works at Quevilly (France) by Lunge's patent freezing process. The firm referred to holds the monopoly of the use of this process in France, and an account of the method of working it has been given by their chemists, Osterburger and Capelle.

The concentrated acid of commerce usually contains only 90 to 93 per cent of pure acid, and as stronger acid is now frequently required for manufacturing purposes, it has latterly been produced (up to 97 to 98 per cent) by concentration in platinum vessels, of which specimens were shown in Class 51 at the Paris Exhibition. It has now been found at the Malétra works that Lunge's freezing process can be satisfactorily carried out on the large scale. The commercial acid is first concentrated in platinum vessels, and it is advisable to bring it up to a strength of 96 to 97 per cent, for the mother liquors from the process are then found to contain as much as 94 to 95 per cent of H_2SO_4 . The acid is then cooled and transferred to a reservoir standing at a higher level than the "filling apparatus." This is made of iron, and is divided by vertical partitions into a number of compartments, each connected to a cell of the cooling apparatus beneath. (Each cell contains about 12½ kilos of acid.) The cooling is effected by means of a solution of calcium chloride kept at a temperature of -20° by an ice machine. In this solution are placed the iron cells.

In order to empty the cells containing the frozen acid, they are placed for a very short time in hot water, so as to loosen the crystals from the sides of the cells. The crystals are then separated from the strong mother liquor, and placed in an enamelled reservoir which is heated by steam or hot water. From this the melted acid is transferred directly to vessels suitable for transport.

No information is given respecting cost of manufacture. If this be not too high, the process should be of great value in preparing concentrated acid suitable for the manufacture of nitroglycerin and celluloid, for dissolving indigo, purifying mineral oils, etc.—*J. Soc. Chem. Ind.*

Action of the Soil on Pathogenic Germs.

THE *Bulletin of the Marine Hospital Bureau*, April 18th, contains the following note, translated from *La Rivista Internazionale d'Igiene*, Naples, February, 1890:

"Pathogenic germs evidently exist in the soil. The bacilli of tetanus, typhus, and cholera have been observed, and it is probable that the bacillus of tuberculosis, the pneumococcus, will be found.

"The superficial strata of the earth are extremely rich in pathogenic germs; at a certain depth there is a limit beyond which the number of germs rapidly diminishes until they cease altogether.

"In the deep strata of the bacilliferous zone pathogenic species do not exist. Grancher and Deschamps have observed the arrest of the typhus bacillus at a depth of 50 Cm. In the cultivated superficial strata there are fewer micrococci than bacilli. The bacilli exist in the soil chiefly as spores. Under this form they best resist destructive agents, and may remain latent for years, retaining their virulence.

"It is probable that the pathogenic bacilli germinate in the soil.

"The cholera bacilli form numerous colonies, at a depth of 3 M. during the months from August to October; from April to June, at a depth of 2 M. there is no development, while at a depth of 1½ M. the bacillus vegetates. At least 2 per cent of humidity is necessary for the development of the germs. Soil rich in organic material is most favorable to this development.

"Causes of death of the pathogenic germs exist in the soil. The principal cause is exsiccation. Koch and Duclaux have demonstrated that this is especially hurtful to the micrococci, and here, according to Koch, is the explanation of the fact that micrococci are relatively rare on the superficies of the soil. The cholera bacillus dies rapidly under exsiccation. Netter fixes three weeks as the extreme limit at which the exsiccated pneumococcus preserves its virulence.

"The two most potent causes of destruction which the microbes encounter are the saprophytic [parasitic tubercular] bacilli and solar light.

"The saprophytic bacilli are in continual strife with the pathogenic microbes, and have generally the advantage. The bacillus of tetanus is exceptional, and may develop favorably in the presence of other species.

"Solar light is injurious to very many bacilli. According to Duclaux, it is the most universal means of sanitation, and the most economical and potent to which public or private hygiene can have recourse.

"The turning up of the soil liberates pathogenic germs, but when the soil is not disturbed for a long time a colossal germination frequently goes on. Exhumation frees the bacteria long latent in the soil; hence the epidemics that follow the turning up of the ground.

"Pathogenic germs leave the earth in many ways to attack men and animals. The soil which adheres to the body, to the feet of animals, and that which is carried by insects, disseminates pathogenic germs. Currents of air transport superficial dust, and so propagate the spores which resist exsiccation. Water also carries germs.

"Ordinarily, subterranean waters are on a level with the bacteriological zone. Sometimes this zone is exposed by fissures or by openings made in the earth. The walls of a well are a prolongation of the superficies, and are favorable to the life of the germs."—*Boston Med. and Surg. Jour.*

A New Reagent for Invert Sugar.

SOME fourteen years ago A. Soldaini proposed a substitute for Fehling's solution, viz., a solution of carbonate of copper in bicarbonate of potassium. It was, however, found that it could not easily be obtained of uniform composition, and that it acted too slowly upon invert sugar.

H. Ost has, however, succeeded in so modifying the composition that the resulting solution may be used with equal facility as Fehling's solution, while it has the additional advantage that the end of the reaction is recognized by the solution becoming entirely colorless. That is, the liquid in which the red cuprous oxide is suspended, or from which it is precipitated, is colorless. Moreover, the reagent remains unchanged on keeping, and it has scarcely any action upon cane sugar.

The following facts will explain the nature of the test solution proposed:

Carbonate of copper is abundantly soluble in a cold concentrated solution of potassium carbonate, forming a deep-blue liquid. There is produced an easily soluble double carbonate of copper and potassium, which can be obtained crystalline, in fine, blue needles. It contains more than half its weight of potassium carbonate. If the above-mentioned solution is heated and boiled, basic copper carbonate generally separates, or black cupric oxide. But if bicarbonate of potassium is present, the solution is no longer affected by boiling or evaporation. On the other hand, potassium bicarbonate alone is a very poor solvent of copper carbonate. Water precipitates copper carbonate from either solution, and this so much the easier the more copper and the less potassium carbonate they contain. The corresponding sodium salts are not as efficient solvents. The reagent devised by Ost is prepared by making the following solution:

Copper Sulphate, cryst.	23.5 Gm.
Potassium Carbonate.....	250.0 "
" Bicarbonate.....	100.0 "
Distilled Water.....to make	1 0 liter.

Dissolve the potassium salts in about 860 C.c. of the water, and the copper salt in 100 C.c. Gradually add the latter to the former, and make up the volume with distilled water to 1 liter.

The analytical value of such a solution varies not only if the amount of copper salt is different, but also when the potassium salts vary in quantity. Hence the above-named proportions must be carefully observed. [It will be well to use the purest available potassium carbonate for this purpose, preferably Merck's "chem. pure" salt. As the solution ought not to be used without its titer having been actually tested upon a sugar solution of known strength, a little variation in the purity of the potassium salts will not make very much difference.]

The solution thus prepared may be used either for volumetric or for gravimetric analysis.

A. Volumetric Determination of Sugar.

Fifty C.c. of the test solution are completely decolorized by 25 C.c. of a 0.4-per-cent solution of pure invert sugar (that is, by 0.100 Gm. of this sugar) on boiling for nine or ten minutes.

An exactly 1-per-cent solution of invert sugar is prepared, according to Soxhlet, by heating 9.5 Gm. of pure cane sugar for half an hour with 700 Gm. of water and 100 C.c. of a one-fifth normal hydrochloric acid (contain-

ing 7.28 Gm. HCl in 1 liter), then neutralizing with soda, and making up the volume with water to 1 liter. [From this solution a 0.4-per-cent one may readily be prepared.]

The end of the reaction is easily recognized—sharply, at least, to 0.4 C.c.—by the disappearance of color, the liquid finally becoming colorless like water, not yellow as is the case with Fehling's solution.

If cane sugar is present a somewhat smaller quantity of the solution of invert sugar is required to decolorize the reagent. Supposing a solution containing 100 parts of cane sugar holds in solution the following additional number of parts of invert sugar, then the number of cubic centimeters of the reagent required will be those placed by the side of them in the following table:

Invert Sugar.	C.c. of Reagent.
100 and more parts.....	25 C.c.
20 parts.....	24.8 "
5 ".....	24.5 "
2 ".....	24.35 "

B. Gravimetric Determination of Sugar.

Fifty C.c. of the copper solution are mixed with a quantity of solution of invert sugar corresponding to not more than 0.100 Gm. of it, and the volume of the mixture made up with water to near 75 C.c. If not more than 0.050 Gm. and not less than 0.020 to 0.025 Gm. of the sugar is used, the boiling need not be continued over six minutes, and for every 1 Mgm. of invert sugar there will be precipitated 0.0034 Gm. of cuprous oxide, irrespective of the excess of copper reagent present. The cuprous oxide is best caught on a Soxhlet asbestos filter, washed with water, alcohol, and ether, and reduced in a current of hydrogen gas. If the limits above indicated are exceeded, the result will be somewhat irregular.

The quantity of invert sugar originally present is calculated, from the metallic copper found, by dividing the latter by the below given factors (time of boiling, nine to ten minutes).

Copper found. Gm.	Factor	= Invert Sugar. Gm.
0.300	3.00	0.100
0.275	3.15	0.0878
0.250	3.26	0.0764
0.225	3.33	0.0676
0.200	3.38	0.0592
0.175	3.40	0.0515
0.150	3.40	0.0441
0.125	3.40	0.0368
0.100	3.40	0.0294
0.075	3.38	0.0222
0.05	3.30	0.0151
0.025	3.15	0.0079

The copper carbonate reagent above described has scarcely any action at all upon pure cane sugar, but if invert sugar is present the cane sugar has a decided action.—After *Ber. d. Deutsch. Chem. Ges.*, 1890, 1035.

[Note by *Ed. Am. Drugg.*—It is probable that the above-described copper solution will be serviceable for the determination of glucose in urine. We shall shortly be able to report on this subject.]

Commercial Wood Alcohol: its Tests and Assay.

THE following methods of testing and estimating methylic alcohol are given by Vortmann in his "Anleitung zur chemischen Analyse organischer Stoffe."

Impurities of Commercial Wood Alcohol.—The usual impurities are aldehyde, acetone, methyl-acetate, dimethylacetal, allylic alcohol, ethylic alcohol.

On mixing 1 volume of wood alcohol with 2 volumes of concentrated sulphuric acid, the mixture should not acquire a brown or blackish color.

On diluting 1 C.c. of wood alcohol with 5 C.c. of water, and adding a few drops of bromine water, the latter should not lose its tint (absence of allylic alcohol).

Acetone is detected as described further on.

Ethylic alcohol is detected in several methods. According to Berthelot, the wood alcohol is heated with twice its volume of concentrated sulphuric acid, and the vapors conducted first through pure water, then through bromine water. Methyl alcohol yields gaseous methylic ether, which is readily condensed by water. Ethylic alcohol yields ethylene gas, which is insoluble in water, but is easily taken up by the bromine, with formation of oily ethylene-bromide, in which form it may be estimated.

Another method has been proposed by Riche and Bardy. Carefully mix 3 C.c. of wood alcohol with 6 C.c. of concentrated sulphuric acid, warm in a water bath, add 10 C.c. of water, and distil off 7 to 8 C.c. To the distillate add 5 C.c. of sulphuric acid (containing 23 per cent H₂SO₄) and 10 C.c. of a solution of permanganate of spec. grav. 1.0280. After three to five minutes add to the brown liquid 4 C.c. of a solution of hyposulphite containing 50 per cent of the crystallized salt, and finally 4 C.c. of a solution of fuchsin containing 0.02 Gm. in 1 liter. If the wood alcohol to be tested stands below 80 degrees on the alcoholometer, 30 C.c. of it are mixed with 10 C.c. of sul-

phuric acid, and 12 C.c. are distilled off. To the distillate are added 4 C.c. of sulphuric acid, and the method just described applied. Wood spirit, when thus oxidized, is completely converted into carbonic acid, while ethylic alcohol yields aldehyde producing a violet coloring matter with fuchsin. If wood spirit was present, the liquid obtained has a bright yellow color; but even small quantities of ethylic alcohol render the final tint violet.

Acetone and isopropyl-alcohol yield no color. Butyric and amylic alcohol impart a yellow, and propylic alcohol a grayish-green, color to the liquid.

Dimethylacetal is tested for as follows: Dilute the wood spirit with a little water, acidulate with a few drops of hydrochloric acid, and then add solution of soda and iodine. If the acetal was present, a precipitate of iodoform is produced. This test depends upon the fact that dimethylacetal, when pure and undecomposed, does not give the iodoform reaction, but does so after it has been decomposed by a dilute acid. Hence the test is decisive only when the wood spirit, tested directly with soda and iodine solution, does not give the iodoform reaction—that is, when it contains no acetone. If the latter is present, it must first be removed. The residuary liquid is then acidulated with dilute hydrochloric acid, and the test above described applied.

QUANTITATIVE DETERMINATION OF METHYLIC ALCOHOL.

(a) *Krell's Method.*—Into a flask of the capacity of 100 C.c., and closed with a doubly perforated stopper, fit a small (5 C.c.) drop funnel, and through the other hole of the stopper pass a reflux condenser. Place in the flask 30 Gm. of dry iodide of phosphorus (PI₃), and in the drop funnel exactly 5 C.c. of methyl alcohol measured at 15° C. Allow this to flow, in drops, upon the phosphorus iodide. Then warm the flask gently during five minutes in hot water, and distil off the methyl iodide which had been formed. Collect this in a graduated tube, shake it with water, allow to settle, and measure it at 15° C.

Five C.c. of chemically pure methyl alcohol furnish 7.19 C.c. of iodide of methyl.

(b) *Modification of Krell's Method, according to Grodzki and Kraemer.*—Put into the flask (see previous method) 15 Gm. of phosphorus iodide, cool the vessel, and allow to flow into it 5 C.c. of methyl alcohol in drops. Next add 5 C.c. of a solution of 1 part of iodine in 1 part of hydriodic acid of spec. grav. 1.700, digest one-quarter hour at a gentle heat under an upright condenser, and then distil. Five C.c. of pure methyl alcohol yield 7.45 C.c. of iodide of methyl (in place of 7.8 C.c.).

QUANTITATIVE DETERMINATION OF ACETONE.

Kraemer's method is as follows: Mix 1 C.c. of wood spirit with 10 C.c. of double-normal soda solution, in a flask holding 50 C.c. Afterwards add, under constant agitation, and very gradually, 5 C.c. of double-normal solution of iodine. Agitate the mixture with 10 C.c. of ether free from alcohol, measure the volume of ethereal solution, and evaporate a measured portion of it on a tared watch glass. Dry the residuary iodoform a short time over sulphuric acid, and weigh: 3.94 parts of iodoform correspond to 0.58 parts of acetone.

Messinger's Method.—Into a stoppered flask holding 250 C.c. transfer 1 or 1.5 C.c. of the wood spirit to be tested, add 20 C.c. of normal solution of potassa, next 20 to 30 C.c. of one-fifth normal solution of iodine, and shake briskly during half a minute. Next add enough hydrochloric acid (20 C.c. of normal or volumetric HCl) to just neutralize the normal potassa used, and titrate the excess of added iodine by means of a one-fifth hyposulphite solution. The latter is added until the liquid turns colorless (that is, until there is an excess of hyposulphite present). Starch solution is then added, and the titration completed by means of iodine solution. The amount of acetone present in 100 C.c. of the wood spirit is calculated by the following formula, in which *m* denotes the amount of iodine necessary for the formation of iodoform [that is, the amount of iodine which had not been neutralized by the hyposulphite], *n* the volume of wood spirit used for testing, in cubic centimeters and fraction [only 1 to 1.5 is directed to be taken], and *y* is the desired result, viz., grammes of acetone in the wood spirit:

$$y = \frac{m \times 7.612}{n}$$

As the amount of wood spirit to be used for this estimation is so small, it should be measured in a special burette holding 1 or 1.5 C.c., divided into 0.01 C.c.

Adhesive Paste.—A paste which will stick anything is said by Professor Winchell to be made as follows: Take 2 ounces of clear gum arabic, 1½ ounces of fine starch, and half an ounce of white sugar. Dissolve the gum arabic in as much water as the laundress would use for the quantity of starch indicated. Mix the starch and sugar with the mucilage. Then cook the mixture in a vessel suspended in boiling water until the starch becomes clear. The cement should be as thick as tar, and be kept so. It can be kept from spoiling by the addition of camphor or a little oil of cloves.—*Chem. and Drugg.*

Nevada's Salt Mountains.

THE salt mountains located on the banks of the Rio Virgin, an affluent of the Colorado River in Lincoln County, Nev., cover an area of twenty-five miles, extending to within seven miles of the junction of that stream with the Colorado. The salt they contain is pure and white, and clearer than glass, and it is said that a piece seven or eight inches thick is sometimes clear enough to see through to read a newspaper. Over the salt is a layer of sandstone from two to eight feet thick, and when this is torn away the salt appears like a huge snowdrift. How deep it is has not yet been ascertained, but a single blast of giant powder will blow out tons of it. Under the cap rock have been discovered charred wood and charcoal, and matting made of cedar bark, which the salt has preserved, evidently the camp of prehistoric man.

Gambir Culture in Java.

THE cultivation of gambir in Java has been tried many times, but, although the plant grows excellently, extraction has on every occasion yielded a kind of gambir inferior in quality to that produced by the Chinese around Singapore. It is believed that the cause of this inferiority must be sought in the fact that the Chinese during the boiling process add a decoction of the poppy, but the preparation of this decoction and the parts of the poppy used in its manufacture are a secret. As the sale of opium is a strict Government monopoly in the Dutch colonies, and the cultivation of the poppy is not permitted there, it is believed that there is no possibility for the Java planters to compete successfully in this industry.—*Chem. and Drugg.*

Summer Drinks in India.

THE *Medical Record* of Calcutta contains some interesting remarks upon the beneficial effects to be derived from non-alcoholic drinks in the height of summer. After remarking that the very bane of European existence in India lies in the habits of eating and drinking, physiological arguments are adduced to show that highly carbonated materials are very deleterious in hot climates. The custom of the Moguls, who for luxury have had no equal in Indian history, is referred to as offering a fitting example. Their drinks consisted of milk, sweetened waters, or sherbets prepared from subacid fruits, such as lemons, tamarinds, pomegranates, etc., flavored with rose or Keora essences, date juice, numerous vegetable tisanes, and some infusions of glutinous seeds flavored with sugar and essential oils. These were often cooled with ice collected in pits, where it was stored during the winter months. The Oriental races, it is asserted, suffer from few of the diseases which are common to the meat-eating, wine-drinking Europeans. For a hot day a light vegetable diet is recommended, with a spare quantity of meat food and an abundance of cooling, non-alcoholic drinks. Ice is regarded as a necessity, and coffee, tea, and cocoa are to take the place of whiskey and soda. The use of aerated waters, prepared from pure and wholesome ingredients, and the admixture in them of the numerous fruit flavorings which abound in the tropics, are regarded with favor as likely to offer a lucrative source of income to persons engaged in such trade, while also giving the European community a very acceptable form of summer drinks. This suggestion has already to a certain extent been put into practice both in this country and in America, but there is still some uneasiness as to possible evil consequences resulting from the consumption of large quantities of iced drinks when the atmospheric temperature is high. As regards light diet and extreme moderation in the use of alcohol, however, the recommendations are admirable, and might well be followed here.—*Lancet.*

To Relieve Perspiration of the Feet.

THE season is around again when complaints are made regarding excessive perspiration of the feet, and consequent tenderness of the skin and offensive odor. Here are a few remedies gathered from a correspondence in the *British Medical Journal*.

Dr. John Ormsby, Dover, says: Wash the feet at night with very hot water, put on white cotton socks, and immerse the feet, thus covered, in methylated spirit poured into a basin. Wear the socks all night; they will soon dry in bed. During the evening wear cotton socks and common felt slippers, and keep the socks constantly saturated with spirit. In a week the cure will be complete. The best ventilated boots are made of stout canvas, such as is used for tennis shoes, tan or black. They can be made in any fashion, and will be found a great comfort.

"An Old Member" recommends:

Liq. Plumb. Diacet..... 3 ij.
Acid. Carbolic..... 3 ij.
Aqua..... ad 3 ij.

M.

One teaspoonful to be mixed with a pint of warm water, and the feet washed every morning and dried with a soft towel.

Mr. Alfred E. Barrett, M.R.C.S., Holland Park, W., writes: Wash the feet night and morning with soap and water, and, after careful drying, sponge them with the following lotion:

Plumbi Acet. 3 i.
Acet. Destill. 3 i.
Sp. Vini Methylati. 3 ij.
Aq. ad 3 xvi.

S.

Shoes are preferable to boots, and buckskin leather best of all.

Dr. Mansel Sympson, Lincoln, following Dr. Whitla's advice, has had the best results with boroglyceride. The method of application is simple: Soak a pair of socks in a saturated solution of boroglyceride; let them dry, wear them for a day or two (according to the amount of perspiration), and then change for another pair similarly treated. The foetor disappears, and the perspiration will decrease in a few days.

"Brigade Surgeon" recommends a solution of chromic acid, 3 to 5 per cent, as the best to harden and prevent perspiration of the feet. Colored socks should be tabooed, and plain white ones worn, steeped in solution of boracic or chromic acid, often changed, and, for summer, cloth boots.

G. F. writes: Wear low shoes, wool socks, and dust the feet twice a day with iodol. Soon the feet become hard, sweet, and comfortable.

There are ideas in the foregoing for profitable summer specialties. For pedestrians and tourists a small linen bag of antiseptic dusting-powder is most portable. It may be made of:

Violet Powder. 8 parts.
Boric Acid. 4 "
Salicylic Acid. 1 part.
Eucalyptus Oil to perfume.

Mix.

Sometimes the perspiration becomes so profuse as to weaken the sufferer. In such cases a tonic is desirable. The following is a very good one for adults, many of whom cannot tolerate quinine during the hot weather:

Tincture of Gentian. 1 1/2 oz.
Spirit of Chloroform. 8 drachms.
Solution of Strychnine (Brit. Ph. 14). 48 minims.
Water to. 6 oz.

Mix. Dose: A tablespoonful before meals.—*Chem. and Drugg.*

On the Prescription of Alcoholic Stimulants.

THAT it is possible to treat cases, both medical and surgical, and obtain results that are considered perfectly satisfactory, without the use of alcohol either as a food or a medicine, may be accepted as a demonstrated fact. The experience of the London Temperance Hospital shows that patients recover even after severe surgical operations, although alcoholic stimulants are entirely withheld. The experiences of Kane in the Arctic region, and Parkes in the Ashantee campaign, show that, under the very exceptional conditions they encountered, alcohol was not only not necessary, but actually lessened the power of vital resistance. Stanley says that indulgence in alcohol in tropical Africa, even in the form of the lightest beer or wine, is fatal to Europeans. At the same time, it must be acknowledged that in the temperate zone civilized man almost universally uses alcohol as an accessory food, in some form or other, and that physicians, by general consent, accord to alcoholic stimulants an important place in therapeutics. As stated above, there are exceptions to this, and some physicians are opposed to their use absolutely, and appear to have no great difficulty in practising medicine without their aid. But these extreme partisans of total abstinence are rare and far between. The question still undecided is, Do patients recover as quickly, as safely, and as comfortably without alcohol as they do when it is judiciously administered? By common consent this is answered in the negative, with the proviso, however, that as alcohol powerfully influences the vital functions, its physiological action should be kept in mind, and it should be prescribed with as much care as any other toxic agent.

Dr. Burney Yeo, in a recent address,* has taken occasion to protest against the cheap and common qualities of wines so universally used in hospitals in England. The fact is, that foreign wines, so largely consumed both in England and the United States, are more the product of the laboratory than they are of the vineyard. Given a certain quantity of alcohol or high wines, a professional mixer of liquors, with a little caramel and flavoring, will be able to supply any kind of commercial wine or spirits to order. That imported wines are specially prepared for this market is an open secret of the trade, known to customers as well as dealers; what is not generally known is that a large part, possibly the larger part, of the supposed imported wines are manufactured from cheaper wines in this country.

This being the state of affairs, we are ready to welcome

and heartily second the efforts of the enterprising, intelligent, and persevering viniculturists who, during the last twenty years, have successfully solved the problem of growing grapes for the production of good, sound, honest domestic wines in different parts of the country. The wine growers of California, however, having special advantages of climate, thus far appear to have distanced all others in the race. It is difficult to understand, except as a matter of habit and routine, why physicians continue to prescribe adulterated and inferior foreign or factitious wines, when a better class of goods, more fitted for the purpose in every way, is offered at a lower price. Americans should drink American wines. Let us encourage domestic industry, especially where, as in some of the wines and brandies, the home products are more reliable, better in quality, and at the same time more reasonable in price.

The culture of the grape in this country has now reached a point where it can successfully compete with Europe. If it receives due encouragement, the benefit will be mutual among producers and consumers, and physicians can prescribe alcoholic stimulants with more discrimination than is usually exercised at present.—*Dietetic Gazette.*

Exorcism of the Pest Demon in Japan.

DR. C. H. H. HALL, of the United States Navy, in a series of notes upon certain medical customs of the Japanese appearing in the *Sei-I-Kwai Medical Journal*, speaks of the curious belief in the demon who causes epidemic diseases, and who seems to be a sort of enlarged and supernatural microbe. His name is Yaku-iin-no-kami, and his habit is to come and sit by the side of the sick person, much to the detriment of the latter. The method of driving away this evil spirit is, Dr. Hall writes, as follows: A kannushi, or Shinto priest, makes a preliminary visit to the sick-room to extract from the demon a promise that he will depart with him at his next visit. The priest returns on the following day, and, taking a seat near the patient, beseeches the evil spirit to come away with him. Meanwhile red rice (used only upon special occasions) has been placed at the patient's head, a *kago*, or enclosed litter made with pine boughs, is brought in, and four men armed with flags or other weapons have entered and stationed themselves in the corners of the room to prevent the demon from taking refuge there. All are silent but the priest. When the prayer is ended, the patient's pillow is hurriedly thrown into the *kago* and the priest cries, "All right now!" The *kago* is then hastily taken out into the street, and the people within and without begin to shout and beat the air with swords, sticks, or anything at hand, while others beat upon drums and gongs. A procession is quickly formed, composed wholly of men, all of whom wear fillets and horns of twisted straw to keep the demon away from themselves. Banners, a drum, a bell, a flute, and a horn are carried. One man chants, as they move away, "What god are you bearing away?" The others reply in chorus, "The god of the pest we are bearing away!" then the drum, the bell, etc., are sounded. While the procession passes through the town all who are not taking part in the ceremony remain indoors, all houses along the way are carefully closed, and at the cross streets are stationed men armed with swords, who guard that street by cutting the air to right and left lest the demon escape by that way. The litter is borne to some retired spot between two towns, where it is left for a time and all who came with it run away, except the priest, who remains for half an hour to complete the exorcism by some sort of magic, after which the patient recovers. Those who carried the litter spend the night in prayer within a temple, and return home next day after a cold bath in the open air, lest they take the demon back with them. One *kago* is used in common by the town, the lightest case being visited first.

Baking Powders.

R. T. WHEELER, in *Science*, details numerous experiments made with a view to ascertaining the influence of baking powder residues on digestion, and, as a summary of the facts brought out by the investigation, finds:

1. That the residues of all baking powders, no matter how pure may be their constituents, have a harmful effect upon digestion, due in all probability primarily to the fact that the salts are acted upon by the hydrochloric acid of the gastric juice, with the formation of more soluble compounds; and, secondarily, that these salts may form organic compounds with albuminous bodies in the same manner as many of the metals do. 2. That calcium phosphate, on account of its great inhibitory action on digestion, must be regarded as a poor agent for the manufacture of a baking powder, while ammonium tartrate may be looked upon with more favor. 3. That the presence of alum in a powder made with calcium phosphate greatly increases its retarding action. 4. That the least harmful baking powder is one containing only the bicarbonate of soda and cream of tartar, and that the presence of any other chemical substance, however harmless it may be in itself, tends only to increase the complexity of the residue and impair the activity of the gastric juice.

* Before the Section in Pharmacology and Therapeutics, British Medical Association, 1889.

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EDITORIAL.

ABOUT as regularly as summer comes do we get an appeal from some pharmacist for shorter hours, and a remarkable fact connected with this subject is that the writer invariably fails to offer any reason why hours should be shorter, but proceeds with more or less lucidity to discuss some other topic—generally the desirability or feasibility of closing shop on Sundays and keeping open during fewer hours on week days.

Since pretty nearly everybody, excepting these individual pharmacists, seems satisfied with the present division of the day into twenty-four hours of sixty minutes each, and as all timepieces now in use are constructed upon this basis, we very much doubt whether any practical result will follow the agitation of the question. We would like, however, to have some of the promoters of the movement explain just what is to be accomplished by having a shorter hour; how much shorter than the present one they would like to have it, and just why the peculiar needs of the pharmacist demand that he should have a shorter hour than anybody else.

We are aware that in some cases the basis for a charge in prescription work is the time required rather than the value of the material, but we doubt whether much could be gained in this way, for the reason that while the person waiting for the completion of a prescription often finds the time go slowly, he is very likely to notice the clock or his own watch, and refuse to accept as satisfactory the statement that the pills required an hour and a half (by pharmaceutical time), at so much per hour, when he is confident of the accuracy of his watch's testimony that only three-quarters of an hour was consumed.

IN regard to the other question of how many hours a pharmacy should remain open daily, there does not seem to be ground for much argument, as it should depend entirely upon circumstances.

For example, there used to be a pharmacy in lower Broadway, in this city, where the receipts between the usual hours for closing and opening more often exceeded one hundred dollars than fell short of it, and it goes without saying that the store was never closed. Employees

changed, and had their regular times for work, but the money kept coming in all the time.

On the other hand, we know of a store where the only attendant, besides the cat, was a sleepy, ill-kempt, and dirty old man, who wore slippers and spectacles and smoked a pipe pretty much all day. He rarely washed himself, and his windows—never. In course of time his stock consisted largely of dead flies, a most unappetizing soda-water apparatus, and a few pharmaceuticals, among which veterinary specialties were rather conspicuous. So far as any apparent profit would indicate, he might just as well have closed his shop entirely; and in fact there came a time when he did, and the only mystery about it was that he didn't do so long before.

There can be no doubt that the public have become accustomed to finding drug stores open until long after all other places of business, excepting liquor stores, are closed. This has come about through the need for prescriptions written by doctors who have occasion to make late visits. But there is no good reason why the establishment should be kept open upon the same scale as during the early evening. The gas can be turned down and the place left in the care of the proprietor or a prescription clerk and an errand boy after eight or nine o'clock in most cases, and in this way the public may be led to appreciate that the store continues to be open as a matter of accommodation for those who may need medicines rather than for the sake of profit. The same may be said regarding opening for business on Sundays. One of the most successful prescription stores in this city used to have its showcases and soda fountain covered with muslin and its shades lowered on Sundays, the door open, and an attendant or two in "Sunday clothes" ready for any legitimate business. Anything was sold which was asked for, but the general appearance of the place was intended to give the impression that this was Sunday, and the store was kept open only because it was essential to the welfare of sick people.

That proprietor was a conscientious man, a good Christian, and a man of such good business methods that he retired with a fortune. His patrons respected him and paid him good prices, because they had confidence in his integrity and honesty.

THE proprietor is very short-sighted and penny-wise who requires too prolonged attendance by his clerks. If the circumstances of location and business require that the store should be open from early in the morning until late at night, every employee should be required to take some time during the day out of the shop, and have a change of occupation and some amusement. If only one person besides the proprietor is competent to prepare prescriptions, then they should co-operate to enable each to have a run outside on business or pleasure. The "dull boy" who is the result of "all work and no play" is the one who makes mistakes in prescription work, gets careless in regard to habits, and is easily disturbed by the unreasonable demands of customers. And it is more often the overworked assistant, with a hope of greater freedom, than a newcomer who opens the competing store on the next block.

ANOTHER phase of this question seems to have escaped the attention of the promoters of this movement—the fact that the labor of professional men is not regulated by hours, as in the case of artisans and tradespeople. It would be a strange thing indeed to find a lawyer, editor, clergyman, architect, or doctor who worked only for a certain number of hours in each day; on the contrary, their work begins as early as possible and continues, oftentimes, well into the night. It is not a question of a limit for working time so much as a limit of working capacity. This must be also true of the dispensing pharmacist. While the wholesale druggist or manufacturer, who comes into business contact with the trade only, may open and close his place of business at such times as are customary with business houses, the professional pharmacist must conform, rather, to the customs of other professional men, or abandon the professional features of his business.

WHY is it that whenever there is an instance like one of recent occurrence in Brooklyn, in which a man in the last stages of a fatal malady died after taking a dose of a poisonous alkaloid, that the newspaper editor at once assumes that a drug clerk has made a mistake and that it was this which caused the death, rather than the disease?

For many years past the judicial investigations of the few cases of this nature which have been made public have generally resulted in the absolute vindication of the drug clerk, and shown that death has been due to natural causes or the physician's want of judgment; nevertheless editors of the daily papers invariably jump on to drug clerks, as if it were an established truth that he is always to blame. In the instance above referred to a thoroughly competent man, with a good reputation and a family to maintain, has been vilified by the daily papers, as if the only care the editors have in such a case were to make it the subject of a sensational screed and sell their papers. We would like to see a systematic attempt made to bring suits for slander and defamation of character in a few of these cases. The managers of public prints might find this mode of *booming* their publications rather more expensive than judicious, and learn that, until proven to be unworthy, even a clerk in a drug store has a right to his good name and the respect of the community in which he lives.

"PYOKTANIN," the new antiseptic and bactericide, appears to be nothing else than one of the methyl violets, probably that known as "3B." Experiments made at one of the New York public hospitals have shown this.

The use of methyl violet and other aniline derivatives as disinfectants, which comes to us as a novelty, and that a costly one, from Germany, is not so new after all. During the discussion of a paper read by Dr. Chas. O. Curtman, in June, 1882, before the Medico-Chirurgical Society of St. Louis, Mo., and published in the *Courier of Medicine*, August, 1882, the doctor called especial attention to the prospect of using the aniline dyes successfully as bactericides, basing his belief on the great avidity for absorption of these colors shown by the various bacilli then discovered.

AN English correspondent, referring to some remarks on page 19 of this volume relative to the patent on antipyrin, writes to us that he has had occasion to look into this question very thoroughly, and can

"assert without fear of contradiction that the German patent was taken after the matter had been published by the inventor; further, that the English patent was taken some time after the whole of the patented matters had appeared in the patent books and were in the library of the Patent Museum. All this was worked out with the assistance of patent agents and counsel, as it was the intention of Mr. — to start the manufacture of antipyrin in this country. We found that there was no valid patent here."

American Pharmaceutical Association.

The thirty-eighth annual meeting of the American Pharmaceutical Association will be held at Old Point Comfort, Virginia, first session Monday, September 8th, at 3 P.M.

Although I have no official notice on the subject, I understand that the Virginia Pharmaceutical Association have postponed their meeting to the same date, with the intention of holding it simultaneously with that of the A. P. A. and at the same place.

In view of our convention being held in such a delightful location and one so easily accessible from all parts of the country, it is hoped and expected that we will have one of the largest meetings held for years.

Full information regarding hotel and railroad rates will be furnished our members later on, in the usual annual circulars.

All matters concerning exhibits, etc., will be taken in charge by the local Secretary, Mr. Charles E. Dohme. Any communications in regard to same, sent to his address, cor. Pratt and Howard streets, Baltimore, Md., will receive prompt attention.

All papers to be read at the next meeting should be forwarded at as early a date as possible to Prof. H. M. Whepley, No. 113 Market Street, St. Louis, Secretary of Committee on Scientific Papers.

Owing to the lamented death of our much-esteemed President, Prof. Emlen Painter, it devolves on the undersigned to issue this call.

KARL SIMMON,
Acting President.

ST. PAUL, MINN., June 18th, 1890.

Pharmaceutical Associations.

Missouri Pharmaceutical Association.—At the meeting held at Excelsior Spring on June 4th, the Association showed a membership of nearly one thousand, with nearly four hundred in attendance. It elected as president W. E. Baird, of Sedalia.

Massachusetts Pharmaceutical Association.—On the 18th of May the Association met at Haverhill and elected as president E. C. Marshall, of Charlestown; vice-presidents, G. W. Cobb of Newton, C. B. Emerson of Haverhill, and F. T. Whiting of Great Barrington; as directors, E. C. Marshall, G. W. Cobb, F. T. Whiting, C. B. Emerson; secretary, J. W. Colcord; treasurer, I. B. Nichols, of Salem. Boston will be the meeting place in 1891.

Ohio Pharmaceutical Association.—President, F. N. Heath, of Toledo; vice-presidents, P. Acker of Cleveland, and H. G. Eady of Elyria; secretary, L. C. Hopp, of Cleveland; treasurer, F. A. Krantz; executive com., J. H. Von Stein of Upper Sandusky, P. Nehr of Cleveland, and C. E. Ink of Columbus; delegates to Pharmaceutical Section of the A. Med. Assoc., J. U. Lloyd of Cincinnati, L. C. Hopp and G. P. Kauffman of Cleveland. The next meeting will be at Dayton on June 9th, 1891.

Washington Pharmaceutical Association.—On the 13th of May a State Association was founded at Tacoma, in completion of a project inaugurated at Olympia in January last. Nearly seventy members were present, and there is reason to believe that the Association will soon have more than two hundred. The officers are: President, A. C. Clark, of Olympia; vice-presidents, W. P. Bonney of Tacoma, W. H. McCoy of Spokane Falls, and W. A. Hasbrouck of Seattle; secretary and treasurer, W. St. John, of Tacoma. The next meeting will be at Ellensburg in May, 1891, and D. O. Woodworth will be local secretary.

Tennessee Pharmaceutical Association.—At the meeting held in Nashville May 21st the Association elected as president R. H. Gordon, of Nashville; vice-presidents, D. F. Goodyear of Memphis, and D. F. Voight of Chattanooga; secretary, J. L. Thompson, of Nashville; treasurer, C. L. Laurent, of Nashville. The next meeting will be at Knoxville in May, 1891.

Pennsylvania Pharmaceutical Association.—At the annual meeting held in York on the 10th of June, there were elected for the ensuing year: President, J. H. Stein, of Reading; vice-presidents, J. F. Patton of York, and W. H. McGarrah of Scranton; secretary, J. A. Miller, of Harrisburg; treasurer, J. L. Lemberger, of Lebanon; executive com., J. H. Redsecker of Lebanon, C. T. George of Harrisburg, and W. Harris of Hamburg. Bedford Springs will be the place for the next meeting.

Kansas Pharmaceutical Association.—At Topeka, on the 20th of May, the Association held its eleventh annual meeting, and elected as president C. D. Barnes, of Abilene; vice-presidents, C. L. Becker of Ottawa, and J. Hurst of Newton; secretary, A. T. Waggoner, of Topeka; treasurer, H. W. Spangler, of Perry. On the third Tuesday of May next the Association will meet at Ottawa. The Association has two hundred and seventy-five members, twenty-six of whom are recent additions.

Kentucky Pharmaceutical Association.—Not quite seventy members assembled at Richmond on the 21st of May. J. J. Brooks of that place was elected president, and the Association will try Frankfort next year.

Oregon Pharmaceutical Association.—This association was organized at Portland on June 10th, and the following-named officers elected: President, M. M. Davis, of Yacquina City; vice-presidents, G. C. Blakeley of The Dalles, T. Graham of Corvallis, and G. L. Blackburn of Albany; secretary, H. D. Dieterich, of Portland; treasurer, L. G. Clarke, of Portland; executive com., F. Newlin of La Grande, L. Kuebler of Pendleton, J. L. Rogers of McMinnville, O. P. S. Plummer, W. M. Wisdom, and J. A. Rupert, of Portland, and J. J. Fisher of Albina. The next meeting will be at Portland, June 9th, 1891.

Chemical Exhibition at Manchester.—A permanent chemical exhibition has lately been inaugurated at Manchester, England, which already contains a large number of interesting objects, and it is expected the collection will constantly grow in value and extent. Among the novelties is a show of ozonized products from the St. Helen's Ozone Works, Plaistow. Among them is esparto pulp bleached by ozone. Where this agent is employed there is said to be absolutely no "going back"; in fact, an imperfectly bleached material will become whiter by standing, as though some residual ozone were slowly spreading itself, and thereby gradually bleaching the fibres. Ozonized water, suitable for killing microbes and for sterilizing purposes generally. Ozonized oil; this is available either for medical or manufacturing purposes. Ozone-ammoniated lime, the peculiarity being that a considerable quantity of nitrogen is said to be fixed in combination with the lime. Ozone-oxidized mangan, a high oxide of manganese, formed by the action of ozone on a lower oxide. A bleached solution of sugar; before treatment with ozone this liquor was jet black. The bleaching may be performed either before or after boiling. It is also applicable to dry sugar of all grades.

Preparation of Pure Albumen.

PROF. ERICH HARNACK has succeeded in devising a method by which egg albumen may be freed so thoroughly from the inorganic matters which so obstinately adhere to it that it may be regarded in practice as absolutely pure. He has also found that albumen thus purified is perfectly soluble in cold or boiling water, and that it is *not coagulated or rendered insoluble by heat*.

The method adopted for purifying albumen is, in the main, to prepare first as pure a combination of albumen with copper as possible, and then by repeated solution and precipitation to isolate the substance in a pure state.

As the process involves considerable loss of product, it is necessary to start with a considerably larger quantity of albumen than is finally expected as product.

A quantity of albumen is mixed with water and plenty of acetic acid, the filtered solution exactly neutralized, again filtered, and then precipitated with solution of copper sulphate. The resulting bluish-green, flocculent precipitate is carefully washed with water, then diffused in a small quantity of water, dissolved by the addition of a little soda, and immediately reprecipitated by neutralizing with acetic acid. (The freshly precipitated metallic albuminate is soluble both in an excess of the alkali and in an excess of the acid; on neutralizing the solution it is always reprecipitated.) The same operation is repeated, the precipitate again most carefully washed, then dissolved in an excess of soda solution, and the dark-bluish-violet, almost gelatinous, liquid set aside during twenty-four hours. This causes the decomposition of the copper albuminate through the influence of the strong alkali. Upon adding, after the lapse of the prescribed time, enough hydrochloric acid to neutralize the liquid, a colorless, flocculent precipitate of albumen will be obtained which is no longer soluble in an excess of the acid, and which settles easily, while the light-green liquid which holds all the copper in solution readily passes through the filter. On washing the precipitate upon the filter—which must be done carefully and thoroughly—it will be noticed that the precipitate (albumen) swells up and begins to be dissolved by the wash water. This inevitable loss renders it necessary to take into operation a much larger quantity than is expected as product. When the albumen has been completely washed, it is transferred to a platinum capsule and evaporated to dryness. This can be done in a drying closet at a temperature of 100° C. or over. Instead of coagulating, the albumen will at first melt, and finally dry up to a glue-like, transparent, very hard and brittle mass. It is extremely difficult to powder. Prof. Harnack had made for this special purpose a very deep and rather narrow agate mortar, as a metallic mortar would have introduced impurities which he wanted to avoid.

Albumen thus purified contains only about 1 per mille of ash, which is so little that it may be considered as practically absent. At all events, the albumen is absolutely free from phosphorus and phosphates.

The chief properties of this ash-free albumen are the following: When moist it gradually swells up in pure water, becomes yellowish-translucent, and finally forms what may be called a solution in water. Boiling greatly hastens the solution. On adding acids to the albumen swelled up by water, it cakes together and becomes crumbly or flocculent. Albumen which had been completely dried is only very slowly swelled up or "dissolved" by water; but if it is powdered and treated with boiling water, a clear, colorless solution soon results.

The ash-free albumen is neither coagulated nor converted into an insoluble modification on boiling its solution.

Ash-free albumen is precipitated from its aqueous solution—

1. By acids, an excess of which does not dissolve the precipitate.
2. By solutions of neutral salts, even when very dilute; the precipitate dissolves only upon strongly diluting the liquid.
3. By metallic salts, phosphotungstic acid, ferrocyanide of potassium, and other common precipitants of albumen. *But it is not precipitated by alcohol, ether, phenol, or tannic acid.*

The circumstance that the ash-free albumen is not precipitated by alcohol distinguishes it from all other albuminoids; and yet it is a genuine albuminoid itself.

Abuse of Purgatives.

PROFESSOR SÄNGER, at a meeting of the Medical Society of Leipzig, spoke very strongly on the abuse of purgatives. He complained that not only did the public buy immense quantities of aperient pills, draughts, and waters, but that practitioners also pandered disgracefully to the craving for instantaneous relief from constipation, so common amongst patients. Quack laxative medicines were advertised in every newspaper, on walls, in stations, and on the trees and rocks in romantic districts of Europe frequented by tourists. The competition in invention of a new secret purgative was very keen. In this respect, a Polish doctor was not wise in his generation. This gentleman—who, according to Dr. Säger, appeared

to have no special anxiety about his patients' vermiform appendages—prescribed gravel, and boasted that he had already prescribed whole cart-loads; but a drug which anybody could scrape up in his garden could not be patented, and, therefore, would never gain the confidence of the public, who love mystery in purgatives as in other matters. Professor Säger said that the abuse of these drugs caused, not habitual constipation, but rather "artificial constipation." The evil was most prevalent amongst women with chronic pelvic diseases, real or imaginary. He ordered, in such cases, that all purgatives be discontinued. He never had bad results, even when constipation lasted for over a week. Belladonna was the only drug he ever used when flatulence, etc., set in, and when the constipation lasted for very long. He objected to dieting, which kept up a pernicious feeling of invalidism, and, finding that the patients drank little water, he made them take several glasses of filtered water daily, when fasting; occasionally whey or buttermilk was given as a change. Fruit, brown bread, and exercise were recommended. Professor Säger found this treatment far better than massage, visits to watering places, enemata, and other familiar means to the same end. In the long run his patients had natural actions of the bowels, and were cured of their invalidism.—*British Medical Journal*, June 7th, 1890.

Ethereal Oils as By-Products.

DIETERICH points out that in the extraction of aromatic vegetable drugs by water only a small proportion of the ethereal oil contained in them can be dissolved; the greater part remains in the exhausted and apparently worthless marc. Still more noteworthy is the fact that the same is evident in the preparation of alcoholic extracts. If the exhausted and pressed substance is distilled by blowing steam through it, a full yield of essential oil is obtained from the residues of aqueous extracts and a partial yield from those of spirituous menstrua. The author obtained such oils from the residues from extractum absinthii, aurantii cort., calami, cascarillæ, inulæ, achillæ, myrrhæ, sabinæ, valerianæ, from succus juniperi, and from syrupus aurantii cort., chamomillæ, cinnamomi, fœniculi, menthæ pip. There has been a widespread impression that succus juniperi is prepared from the previously distilled berries; the experience of Dieterich indicates the reverse, namely, that the oil is obtained after the juice.—*Br. and Col. Drugg.*

A New Synthesis of Indigo.

A NEW and very simple method of synthesizing indigo has been discovered by Dr. Flimm, of Darmstadt (*Berichte*, No. 1, 1890; *Science*). In studying the action of caustic alkalies upon the monobromine derivative of acetanilide, $C_6H_5NH.CO.CH_2Br$, a solid melting at 131.5°, it was found that when this substance was fused with caustic potash, a product was obtained which at once gave an indigo-blue color on the addition of water, and quite a considerable quantity of a blue solid resembling indigo separated out. The best mode of carrying out the operation, according to *Nature*, is described by Dr. Flimm as follows:

"The monobrom-acetanilide is carefully mixed with dry caustic potash in a mortar, and the mixture introduced into a retort, and heated rapidly until a homogeneous, reddish-brown melt is obtained. This is subsequently dissolved in water and a little ammonia or ammonium chloride solution added, when the liquid immediately becomes green, which color rapidly changes to dark blue, and in a short time the blue coloring matter is for the most part deposited upon the bottom of the vessel in which the operation is performed. The fused mass may also conveniently be dissolved in dilute hydrochloric acid, and a little ferric chloride added, when the formation of indigo takes place immediately. The collected blue coloring matter may be readily obtained pure by washing first with dilute hydrochloric acid and afterward with alcohol."

That this blue substance was really common indigo was proved by the fact that it yielded several of the most characteristic reactions of indigotin, such as solubility in aniline, paraffin, and chloroform; its sublimation; and the formation of sulphonic acids, which gave similar changes of color with nitric acid to those of indigotin. The final proof was afforded by its reduction to indigo-white and reoxidation to indigo-blue by exposure to air. Moreover, the absorption spectrum of the coloring matter was found to be identical with the well-known absorption spectrum of indigo; hence there can be no doubt that indigo is really formed by this very simple process.

A Simple Form of Quick Filter.

THERE have been many good forms devised for a quick filter, and the principal objection to them collectively is that they are too expensive and cumbersome to be given out to every student. The writer has long felt the need of some form which would take little apparatus and cost as

little as possible. The following form has recommended itself, since its design by the writer about a year ago, by its uniformly satisfactory performance under every test:

A platinum disc, 1 inch in diameter, is cut from ordinarily stout foil. This is then perforated by a steel point with small holes, placed about the same as in Cook's modification of Dr. Carmichael's reverse filtering button. A margin of about one-sixteenth inch ought to be left unpierced. The disc thus prepared is placed in a funnel, which can be cut off, if desired, so that the disc will be about one-quarter inch below the rim of the funnel. A smaller disc of filter paper about one-sixteenth inch larger than the disc is now placed in the funnel just above the disc. Water is applied and pressure turned on. The paper at once settles down and makes an air-tight joint at the edge of the disc. The precipitate can now be brought on the paper and washed as usual.

The results are as good, as to rapidity, as in case of any form of quick filter, and the ease and convenience attending its use will, I hope, recommend it to some chemists.—JOSEPH TORREY, in *Chem. News*.

A Woman, charged with drunkenness at the Southwark [London] police court the other day, excused herself upon the ground that she had "to use a great deal of chlorodyne."

Detection of Terpin in the Urine.—M. Loison has devised a simple plan for detecting terpin in the urine in very small quantity, based on the fact that his substance, when treated with hydrochloric acid, evolves a hydrocarbon which colors chloride of antimony red.

Cascara Sagrada Wine.—A useful wine may be prepared by mixing one part of fluid extract of cascara sagrada with nine parts of sherry. After macerating for eight days, the mixture must be filtered, and will then be ready for use. The dose is a small wineglassful.

Pepsin and Pancreatin.—*New Idea* states that there is pepsin now in the market fully five times the strength of what was offered at the beginning of the present decade. There has been a similar improvement in pancreatin. Four years ago only three specimens out of twenty were found to be better than sawdust; now the poorest in the market is equal to the best of that time.

Explosion of an Oxygen Cylinder occurred on January 23d at the Rosehill works of the Scotch and Irish Oxygen Company, Polmadie. While the foreman was in the act of carrying a cylinder, it unaccountably exploded with great force, injuring him fatally. Portions of the cylinder were afterward found a quarter of a mile off, although fences were penetrated in their flight.—*Scient. Am.*

Compound Licorice Powder as an External Remedy.—A New York physician gave a patient, suffering from inflamed testicle, prescriptions for compound licorice powder and tincture of iodine, and was greatly surprised by the rapid recovery which followed the taking of a teaspoonful of the tincture internally, and the rubbing of the powder into the swollen scrotum. We are not sure which amuses us the most—the error of the patient or the title which the doctor gives to his paper, in which the cure is attributed to the external use of the powder.

Antidiphtherin is the name of a medicinal specialty which has lately been introduced in Germany. Dr. A. Donner finds that it is a mixture of 4 parts of ferric chloride and 96 parts of potassium chlorate.—*Chem. and Drugg.*

[*Note by Ed. Am. Drugg.*—A combination of these two agents, in various proportions, usually in combination with glycerin, and in suitable dilution with water, has long been used in diphtheria and other forms of inflammatory sore throat.]

Narceine with Anæsthetics.—At a recent meeting of the Academy of Medicine, M. Laborde announced his discovery of the fact that crystallized narceine prevents the vomiting and digestive derangement which often follow the administration of chloroform; moreover, the narceine is claimed to prevent fatal consequences in persons to whom chloroform is administered by inhalation. That is what the experiments on rabbits are reported to have yielded—but man has yet to be tried.—*Paris Correspond. of Chem. and Drugg.*

The Bouquet of Wines and Brandies.—M. A. Rommier shows in a paper contributed to the Academy of Sciences that different ferments produce from the same grapes wine of different flavor, and that solutions of sugar, fermented by means of the natural ferments obtained from different districts, yield on distillation alcohols possessing different odors; and it is suggested that the characteristic bouquet is due to a compound ether formed from the alcohol combined with a fatty acid produced from the fat, which each ferment manufactures from the sugar for its own use.

Castor Oil Draught.—

Syr. Rhei Arom.....	3 iv.
Sodii Bicarb.....	gr. xv.
Acid. Tartaric.....	gr. v.
Aq. Menth. Pip.....	3 iss.
Ol. Ricini.....	q. s.

Dissolve the soda in the arom. syr. rhubarb, then add the tartaric acid and stir well. Now pour the peppermint water carefully down the side of the tumbler, so as not to disturb the foam, and then pour the oil through the centre of the foam, and drink.—*Registered Pharmacist.*

Automatic Mineral Water Apparatus.—A Parisian correspondent of the *Chemist and Druggist* writes: There has been a great rush on the automatic drinking bar in the Rue Montmartre during the warm weather with which we have been favored of late. This bar has a couple of dozen of the largest sized automatic tanks containing all sorts of drinks, including mineral waters. It is usually thronged with workmen, but is shunned by the Paris masher, who requires a lot of attention either from a polite waiter or a pretty barmaid. This attention is not forthcoming at the automatic bar.

Resorcin as an Anti-Emetic.—Although impure resorcin, as a rule, causes nausea and vomiting, the chemically pure article, according to Andeer, is the surest anti-emetic that can be administered in all kinds of vomitings from the most varied causes, even in the persistent vomiting of hepatic, renal, and menstrual colic, in the pernicious vomiting of pregnancy, in sea-sickness, in vomiting after over-indulgence in food, drink, etc. It may be given in solution or powder in daily quantities of from 0.5 to 3.0 Gm.—*Ther. Monatshefte.*

The True Inwardness of Antisepsis.—The progress of bacteriology has shown that aseptic surgery means scientific cleanliness; the same lines of investigation, says the *British Medical Journal*, show how very dirty people can be. Seventy-eight examinations of the impurities under finger-nails were recently made in the bacteriological laboratories of Vienna, and the cultivations thus produced showed thirty-six kinds of micrococci, eighteen bacilli, three sarcinæ, and various varieties; the spores of common mould were very frequently present.

The Pharmaceutical Press Abroad.—Pharmacy in foreign parts has been enriched by the establishment in Spanish America of two journals devoted to the craft, viz., *La Farmacia* (Mexico) and *El Progreso Medico-Farmacéutico* (Buenos Ayres). As a set-off against this advance in the west, we have to record the sad fact that the only chemical journal published in the Hungarian language has bled to death for want of support. It was published at Klausenburg under the title of *Vegytsani Lapok* (leaves of chemistry). These particular leaves could never strike root, though they vegetated for a long time.—*Chem. and Drugg.*

William Woodward, a member of the firm of E. Fougere & Co., importers of French drugs at No. 30 North William street, died July 5th, of Bright's disease, at his home, No. 172 Clinton street, Brooklyn. Mr. Woodward was in the fiftieth year of his age, and was born at Georgetown, D. C. He removed to Brooklyn in early life and was educated there. While a young man he was a clerk in his father's store. When the war broke out he entered the navy, rose to the rank of paymaster, and served on several leading vessels. Upon returning home he re-entered business and was employed in the wholesale paint store of S. S. Townsend. About a dozen years ago the business of E. Fougere & Co. was purchased by Messrs. Woodward & Heydenreich, and has since been conducted by them.

Important Trade-mark Decision.—A judgment has just been given in the French law courts which is of considerable importance as affecting the marking of goods with a false place of origin. The town of Bar-le-Duc has long been famous for its confections, and the trade in these goods, which is of considerable value, is mainly in the hands of six old established firms of "confiseurs." The fame of the "confitures de Bar" excited the jealousy of two firms of confectioners in Ligny, who proceeded to place their goods on the market labelled as "*Confitures de Bar*." For doing so they have been prosecuted by the six genuine Bar confectioners jointly. The judgment of the lower court went against the Ligny people, and this has been confirmed on appeal, a permanent injunction having been granted, which will prevent any firms not actually located in Bar-le-Duc from exploiting the reputation of that ancient fortress by using its name on their goods.

A New Bill on Wine Manufacture.—The French Senate has under discussion a bill introduced by M. Griffe, with the objects of placing under official control the raisins used for making wine, of tracing the different uses to which raisins are put in wine manufacture, and of giving publicity to applications for sugar at reduced rates used in sweetening the vintage, etc. Prohibitive measures are required, says the introducer of the bill, to protect the public health and in the interests of commercial integrity. It would seem, however, that M. Griffe has taken up the cudgels for the Bordeaux wine growers, to the detriment of all others. His bill is not likely to pass as it stands at present. It is well known that certain Burgundy vintages require the addition of sugar, especially when, after a cold summer, the grapes are too acid. Also, wine made from raisins may be in no way detrimental to health, though few people would purchase it if labelled "raisin wine."

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,465.—"Schweizer Pillen" (Swiss Pills) (E. J. W.).

This nostrum, which is much advertised in Germany and other Continental countries, is reported to consist of the following ingredients:

Extract of Aloes (or of Cascara).....	30 grains.
" " Gentian.....	30 "
" " Frangula (or of Rhubarb).....	90 "
Powd. Gentian	q.s.

Make into pills weighing 2 grains each.

No. 2,466.—Teinture de Mars Tartarise (C.).

This is a weak alcoholic solution of tartrate of iron (ferrous and ferric) and potassium, which was formerly official in the French Pharmacopœia. It is prepared as follows:

Iron filings.....	100 Gm.
Tartrate Potassium and Sodium.....	250 "
Alcohol.....	50 "
Water.....	3,000 "

Put the iron filings and cream of tartar into an iron vessel, and add enough water to make a thin magma, and macerate for twenty-four hours. Then add the remainder of the water and boil for two hours, frequently stirring and replacing the evaporated water. Allow to settle, decant the supernatant liquid, filter, and evaporate it until it has a spec. grav. of 1.280. Next add the alcohol, mix thoroughly, filter, and put into bottles.

This preparation is, properly speaking, not a tincture.

No. 2,467.—Methylene Blue as Medicine (Several Inquirers).

We are aware that there has been a demand recently, from a number of physicians, for "methylene blue," but we are in a position to know that, in most cases, this was intended to be used as a staining agent for pathological sections. More recently, however, the coloring matter has been experimented with as an internal medicine, being given as an anodyne in doses from about 1½ grains up to 10 or more grains. If wanted for this purpose, a pure methylene blue should be used, but we do not believe that there is any of the pure material as yet on our market.

We therefore caution our readers to procure or order for internal use only such "methylene blue" as is free from metallic impurities. As there is none in the market as yet, it will not be long before the leading houses will have a stock of it.

The substance known in trade as "methylene blue" (see p. 143 of this number) is either the hydrochlorate of tetramethyl-thionine, or the double chloride of zinc with this base. The last is the only one now obtainable here. This salt has the composition $(C_{12}H_{12}N_4S_2Cl_2) \cdot ZnCl_2 \cdot H_2O$, and, therefore, contains 17.15 per cent of zinc (Zn).

In commerce it is also known as "ethylene blue" or as "methylene blue D. B. B."

A salt free from zinc leaves no residue upon ignition. If a residue is left, the usual analytical methods will identify the metal.

No. 2,468.—Color of Ferric Hydrate ("Ferrum").

This subscriber writes: "Will you kindly inform me why there is a difference in the color of the oxide of iron produced, according as the iron solution is added to the magnesia mixture or vice versa? If the iron solution is poured into the magnesia mixture, a dark-brown or red mass is produced; but by following the directions of the Pharmacopœia a light reddish mass results."

The difference in tint is owing to the fact that, when the iron solution is poured into the magnesia mixture, some of the ferric hydrate formed mechanically occludes or retains some of the undecomposed iron solution, which causes the darker tint of the precipitate. The decomposing agent—viz., the magnesia which surrounds the liquid poured in—and the precipitate first thrown down by it, are no longer able to reach the interior undecomposed portion unless the mixture is briskly stirred. This will, of course, eventually bring about the same result as is obtained by proceeding in the correct manner; but it usually takes a long time to break up all the small lumps of precipitate so that the magnesia can reach any of the unaltered iron solution. It is different when a soluble alkali (soda or potassa or ammonia) is used. These are able to penetrate wherever water can. But magnesia cannot pass through the minute intermolecular interstices.

On the other hand, when the magnesia mixture is poured into the iron solution the conditions are reversed. There is always an excess of magnesia present, wherever any may happen to be, until stirring has brought about decomposition.

No. 2,469.—Aromatic Mouth Wash (P. E. & Co.).

We are informed by several of our friends that the formula for a fragrant and antiseptic mouth wash published by us in previous issues has given very decided satisfaction and has met with a considerable sale. Naturally, each of our correspondents introduced a slight modification, sufficient to render his product dissimilar to others. In one case a very small quantity of red coloring matter was all the alteration made.

One of our friends, who has used the preparation for his private comfort and not for sale, informs us that the addition of a small amount of oil of calamus appears to render the flavor of the mixture more lasting and acceptable. In order to place the modified formula at the disposal of our readers, we publish it here:

Oil of Sassafras (preferably "Safrol").....	720 min.
" " Pinus Pumilio.....	240 "
" " Curacao.....	240 "
" " Wintergreen.....	48 drops.
" " Calamus.....	60 "
" " Anise.....	12 "
" " Rose Geranium.....	12 "
" " Vertivert.....	12 "
Naphthol (Beta).....	120 grains.
Solution of Saccharin (N. F.).....	1 fl. oz.
Chloroform.....	1 "
Glycerin.....	1 pint.
Alcohol.....	3 pints.
Calcium Phosphate.....	q. s.
Water.....	enough to make 12 pints.

In the alcohol dissolve the oils, naphthol, and chloroform. Add to the solution the glycerin and solution of saccharin, and gradually add water until the product measures 12 pints. Allow the mixture to stand some time, frequently shaking; then mix it intimately with about 4 oz. of calcium phosphate, and filter.

No. 2,470.—Sugar Coloring (B. W. & Co.).

We are asked to give a method for preparing "sugar coloring" which is not too thick and will not impart a bitter taste to liquids which are to be colored by it.

The commercial sugar coloring or caramel has, indeed, often a disagreeably burnt and bitter taste, though this is frequently of no importance, as the quantity of coloring matter required is usually quite small. Still, if our correspondents desire to prepare themselves a coloring matter free from bitterness, we advise them to use the following method, which has long been in use in Europe, and which furnishes a product of thin fluidity and of good keeping qualities.

Moisten 1,000 parts of crushed or granulated sugar with 400 parts of water, and heat the mixture in a porcelain or agate-ware basin, standing on a sand bath heated by a moderate flame, with constant stirring until the mass becomes colored, emits penetrating fumes, and gradually has acquired a brownish-black or black color. As the mass swells up considerably, a capacious vessel must be used. After the mass has turned dark brown, a drop must be removed from time to time and chilled off with cold water. If it is hard and easily friable, and turns out to be completely soluble in water of ordinary temperature, the process should be interrupted. The product should still possess a sweet or sweetish taste. It is now poured, in a thin stream, into another vessel containing 2,000 parts of hot water, and allowed to cool. Next, 2,000 parts of alcohol are added, the mixture allowed to stand a few days, and then filtered. One part of sugar should yield about 5 parts of product.

Sugar coloring is often used to color liquids containing alkaloids, for instance, certain elixirs (Elixir Quininae Comp., etc.). In this case it is necessary to use a coloring free from alkalies, or rather alkaline carbonates. The absence of these may be recognized by the fact that chloride of barium, added to a dilute solution of the coloring, produces no cloudiness even on prolonged standing. For ordinary use caramel is usually prepared by adding to the sugar 2 or 3 per cent of an alkali carbonate, and copper boilers are used for heating.

No. 2,471.—Quantitative Determination of Albumin in Urine (B. F. J.).

The method which we prefer is gravimetric, simple, and, if properly executed, gives reliable results. Of course its execution requires a suitable drying oven and good balances. In this case the albumin obtained is that which is coagulated by heat, and it is weighed after being dried at 100° C.

A definite quantity of the urine—about 100 Gm. when only a small amount of albumin is present—is warmed in a beaker, and a very dilute (1 per cent) acetic acid added, drop by drop, until the albumin begins to separate in large flakes. The liquid is now boiled and filtered through a good platinum filter lined with a film of asbestos, a filter pump being used for hastening filtration. The filter is washed with water until the washings no longer react for chlorides. (It may be presumed that when no more chlorides are present, all other soluble matters of the original urine, except the albumin, have been washed out.) The filter is then washed with alcohol, and lastly with stronger ether, and finally dried to constant weight at 100° C.

There are other methods of estimating the amount of albumin. One of those which are at present much used, but is only relatively reliable, is Esbach's. It depends upon ascertaining the height of the precipitate, formed in a graduated tube, by a particular reagent within a given time at a certain temperature. The tube or albuminometer required for it is in form of a large test tube, provided with a stopper. The tube is graduated from below upward with figures (1, 2, 3, 4, 5, 6, 7), each of which represents the amount of albumin, in grammes, contained in 1 liter of the urine. Near the centre of the tube is a mark, U, up to which it is to be filled with urine. And nearer to the top is another mark, R, up to which it is to be filled with the reagent. The reagent is prepared by dissolving 10 Gm. of picric acid and 20 Gm. of citric acid in enough distilled water to make 1 liter.

Before making the actual assay, the amount of albumin ought to be determined approximately, and the urine, if necessary, diluted so that it may not contain more than about 0.4 per cent of albumin. The tube is then filled with the urine to the mark U, enough reagent poured in to fill the tube up to R, the tube closed with the finger and gently reversed several times so that urine and reagent become intimately mixed. The tube is then closed with the rubber stopper, and set aside for twenty-four hours at the ordinary indoor temperature, after which time the height of the sediment is read off. Supposing the latter to reach to 4, then the urine contains 4 Gm. of albumin in 1 liter, or 0.4 Gm. in 100 C.c. As the highest number on the tube is 7, this corresponds to an amount of 0.7 Gm. in 100 C.c. Hence if the urine were to contain more albumin than 0.7 per cent, it would have to be suitably diluted.

It has been ascertained by Ritter that this test gives unreliable results when antipyretics had been administered.

The method is also in other respects not entirely trustworthy. However, if it is used to determine the relative increase or decrease of albumin in the urine of one and the same person at successive periods, the adhering errors are reduced to a minimum.

Another method of estimating albumin has been pro-

posed by Brandberg. This method is less affected by errors than the preceding. It depends upon the appearance or non-appearance of a turbidity in a series of samples of the urine, acidulated with nitric acid, and of various though known dilution. It is executed as follows:

First prepare a 10-per-cent solution of the urine by mixing 5 C.c. of it with 45 C.c. of water. Place upon the bottom of a test tube, without touching its sides, by means of a pipette, 3 to 5 C.c. of nitric acid, and on top of the latter, likewise with a pipette, some of the diluted urine. (If more than 1 part of albumin in 40,000 is present, there will be a more or less prominent white ring or turbidity appearing at the line of contact of the two liquids.) If the turbidity appears within two and one-third to three minutes, the diluted urine used contains one-three-hundredths per cent of albumin; hence the undiluted urine 0.033 per cent. If the turbidity appears later, or not at all, then the amount of albumin in the undiluted urine is less than 0.03 per cent. If it appears earlier, it is more than 0.03 per cent. In this case the urine must be further diluted until that rate of dilution is found in which the turbidity will appear within two and one-third and three minutes. For this purpose five test tubes are selected and numbered. Into each are put 2 C.c. of the diluted (10 per cent) urine, and certain amounts of water added to each, viz., to I., 4 C.c.; to II., 13 C.c.; to III., 28 C.c.; to IV., 43 C.c.; and to V., 58 C.c. The original test is now applied to each of these mixtures successively. If one of them produces the white ring or turbidity with nitric acid at the end of three minutes, it contains 0.0033 per cent of albumin. But if it appears earlier, or later, or not at all, other dilutions must be made, to hit the point when the turbidity makes its appearance just at the end of three minutes.

The amount of albumin in the original urine is calculated by adding the number of cubic centimeters of diluted (one-tenth) urine used (namely, 2) and the number of cubic centimeters of water added, and dividing the obtained sum by 60.

This method is stated by Hammersten to give very close results, the error usually being less than 0.206 per cent.

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[CHEMICAL REAGENTS.] USES, TESTS FOR PURITY, AND PREPARATION OF CHEMICAL REAGENTS, employed in Qualitative, Quantitative, Volumetric, Docimastic, Microscopic, and Petrographic Analysis, with a Supplement on the Use of the Spectroscope. By CHAS. O. CURTMAN, M.D., Prof. of Chemistry, etc., Missouri Med. College. With 12 plates. 8vo. St. Louis, 1890.

THIS book is unique. We have carefully perused the text while it was in course of publication in a St. Louis pharmaceutical journal (*Meyer Brothers' Druggist*), and have taken from it many a hint which will be useful to us in our daily work. A systematic treatment of the subject of reagents—carried out more fully than is customary in text books on analytical chemistry or feasible in laboratory instruction—brings together a variety of points which are apt to escape one if the reagents are looked upon merely as the tools with which work is to be done. The present book bears every evidence of representing many years' study and accumulation of facts on the part of the author. The chapter on the use of the spectroscope particularly evidences the author's thorough familiarity with this subject. The book will be used with profit by every one who is engaged, professionally or only occasionally, in analytical work.

A MANUAL OF PHARMACEUTICAL TESTING for the Man of Business and his Assistants, comprising simple Instructions for the Testing of the Chemicals of the British Pharmacopœia, etc. By BARNARD S. PROCTOR, F.I.C. 8vo. London (Office of *Chemist and Druggist*), 1890.

THIS handy little volume contains an amplification of the tests given by the Brit. Pharm., not only of the "chemicals" (to which the title would seem to restrict it), but also other of-

ficial substances, such as opium, oleum olivæ, pepsinum, etc., etc. Besides the official tests, which are suitably explained and commented upon, a number of others are added, with many practical hints on manipulation. The subject of the assay of vegetable drugs is not touched upon, except where the Pharmacopœia itself requires it; for instance, under Ext. Nucis Vom., Opium, Spir. Ætheris Nitrosi, etc. The last-named article is particularly well treated. We can recommend the little book as being very useful also to the American pharmacist.

IMMUNITY THROUGH LEUCOMAINES. By EUSEBIO GUÉLL BACIGALUPI. Translated from the second French edition by R. F. RAFAEL, M.D. New York: J. H. Vail & Co. Pp. 170, 8vo.

ATTRACTED by the results of inoculations upon domestic animals for the prevention of zymotic diseases, the author has attempted, by reasoning rather than by experimentation, to establish as a principle that the microbes which cause disease are not capable of development in the person in whom exist the leucomaines which are formed during the development of these microbes; or, to quote one of his conclusions: "Vaccination, to preserve from an infectious distemper, should, therefore, consist in introducing into the organism by artificial means the leucomaines of the microbe that produces the disease against which protection is sought."

CATALOGUE OF SODA FOUNTAINS AND COUNTER FRONTS MADE BY THE LOW ART TILE COMPANY, Chelsea, Mass. Printed by the Forbes Co., Boston and New York.

IT is some time since this beautiful piece of work came to hand, but we now ask the attention of those who contemplate the purchase of an apparatus or store fixtures to look into the merits of these wares. From an artistic standpoint they far excel anything else that we have ever seen.

With all the richness of color possessed by marbles, they are capable of affording much more graceful outlines and details. Their durability is equally great, and, in the event of breakage, the injured portions can be replaced at a comparatively nominal cost.

TRANSACTIONS OF THE MEDICAL SOCIETY OF THE STATE OF NEW YORK for the year 1890. Pp. 490, 8vo.

Published by the Society (F. C. Curtis, M.D., Secretary, Albany, N. Y.). SINCE its organization in 1806 this Association has been most actively engaged in advancing the medical sciences, and its published reports always contain many valuable contributions by men of eminent ability. The present volume is no exception, and aside from matters of purely scientific importance contains the text of recent laws affecting the medical profession.

PRACTICAL SANITARY AND ECONOMIC COOKING. Adapted to Persons of Moderate and Small Means. By MRS. MARY HINMAN ABEL. The Lomb Prize Essay. Published by the American Public Health Association. 1890, pp. 190, small 8vo.

MR. LOMB, of Rochester, N. Y., offered prizes in 1888 for the best two essays on the subject expressed by the above title, and this work is the one ranking first. While there is great need for a better knowledge, among people of limited means, of the best methods for gaining the best nutriment for the money expended, much which has already been written has been founded upon foreign experience and methods, and is but imperfectly adapted to the social needs and food resources of this country. The work here noticed is not amenable to this criticism, and can be studied with profit by all with whom economy and not parsimony is desirable. To enable the book to reach those for whom it is intended, it is sold through all book stores at the cost of publishing it.

American Druggist

Vol. XIX. No. 9.

NEW YORK, SEPTEMBER, 1890.

Whole No. 195.

CRUDE DRUGS AT THE LONDON DRUG SHOW ROOMS.

LONDON furnishes better facilities for the study of materia medica from original sources than any other place on earth. A walk through the show rooms or auction rooms is at all times interesting, as many of our readers will know from personal experience. Our contemporary, the *Chemist and Druggist*, has recently published an interesting account of what is to be seen there, from which we take certain portions relating to the more important drugs:

GAMBOGE.

Gamboge is usually imported in odd cases, with an inner covering of coarse calico, usually about a picul (133½ pounds), sometimes only half a picul, and not infrequently about 200 pounds in weight. The drug appears most frequently in rolls of various length, sometimes solid, more often hollow in the centre, that shape being produced by the method of collection of the gum, which is caught from the trees in bamboo sticks, the latter being peeled off when the juice inside has hardened. The pieces often bear the impress of the bamboo. Occasionally we receive the gum in more or less shapeless blocks and lumps, which clearly reveal that they have been packed in palm leaves. The dog-Latin name "gummi guttæ," by which the drug is known on the Continent, is now generally admitted to be derived from "gatah," gum, and "juma," medicinal, both words being used by the Malays of the Dutch colonies and the Malacca peninsula, the Dutch having first introduced the article into Europe. Gamboge is exceedingly liable to adulteration at the place of shipment, and it is also met with in a damp state.



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ALOES.

In proportion to the superficial area occupied by it, Curaçao aloes is about the least valuable drug shown at the warehouse. The average supply on sale during the last few years must have been quite 250 or 300 cases per auction.



The weight of a box of Curaçao aloes is from 80 to 100 pounds, and the drug forms one hard mass with the wood, having been poured into its receptacle fresh from the boiling caldron.

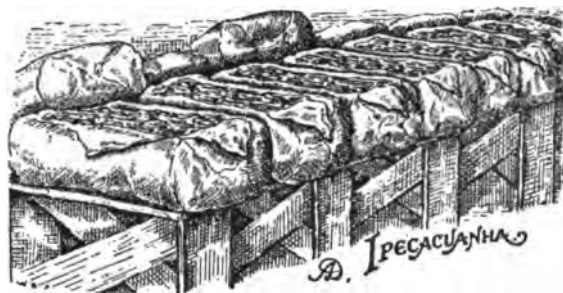
Barbadoes aloes is scarcely ever met with now, but the better varieties of Curaçao are usually brought into commerce under that name by the wholesale

houses, though twenty years ago the production of aloes in the island of Barbadoes was still about 50 tons per annum. Curaçao aloes sometimes possesses the property of changing color gradually, thereby becoming much more valuable; but of late very little care has been taken to boil the juice in a proper manner, and it is now quite a common occurrence to see this article knocked down at the drug auctions by fifty boxes or more at a time, for scarcely enough money to pay the freight from the island to New York and thence to England. The Cape variety of aloes is not known at the Crutched Friars warehouse, but at the brokers' sample rooms along with most other drugs comprised in the catalogues. About 100 or 120 years ago, when aloes was first manufactured at the Cape by the Dutch Boers, its price in the London market was from 200s. to 250s. per cwt.; now it is scarcely worth a tenth of that money. The manner in which Zanzibar and Socotrine aloes is packed has been frequently described, and every one has heard of the "monkey skins" in which the juice is sent from the island where it is produced and from the adjacent parts of the mainland. Not infrequently the aloes is repacked in Zanzibar or in Bombay, and it is now met with in all manner of packages, petroleum tins being the most usual receptacle for Zanzibar aloes, while the Socotrine aloes is often repacked in Bombay in French brandy cases, of which the available supply in that market is apparently inexhaustible.

IPECAC.

Ipecacuanha is sometimes shown in very large quantities, 70 or 80 "serons" at a time, while at other periods it is exceedingly scarce.

Most of it is now imported via Antwerp, but sometimes we receive direct consignments from Montevideo, Buenos Ayres, or Rio. Formerly the drug was imported exclusively in cowhide "serons," which were sewn around it while still fresh and supple, and during the journey hardened and shrank to such an extent as to form a perfectly hard and solid wrapper. But about two years ago Mr. Weare pointed out that, when the root was packed into the "seron" in a slightly damp state, the thickness of the hide prevented the water from evaporating, and from

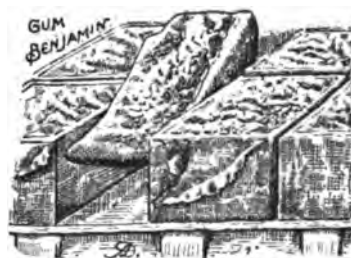


50 to 80 per cent of the packages consequently arrived in a damaged condition. Since then all the importers have adopted the present mode of packing, in which the drug is simply pressed in stout canvas bales, with an under-covering of rough calico, as shown in our illustration. The weight of a "seron" was usually about 1½ cwt., representing, it is said, the result of a fortnight's work of an average collector; but the bales are of very irregular shape, weighing sometimes only 80 pounds and sometimes attaining as much as 200 pounds in weight. The drug is valued according to the thickness of the ridges which it forms round the stem, and the brightness of the fracture. Some buyers also attach importance to the color, which varies from a pale gray to iron gray or red-brown, the red-colored packages being often preferred. It has been said that the supply of ipecacuanha ought to depend upon that of Brazilian india rubber, the latter article being now very largely produced in those parts of the province of Matto Grosso which also furnish the chief supplies of ipecacuanha.

Labor is exceedingly scarce in the interior of Brazil, and whenever the demand for india rubber is brisk the laborers find it much more pleasant and advantageous to collect rubber than to dig for "poaya," or ipecacuanha root. The East Indian ipecacuanha, which has been seen sporadically in our drug sales of late, has been imported in wooden cases of very irregular weight. To show the ipecacuanha for the auctions, the upper covering of the "seron" or bale is unsewn.

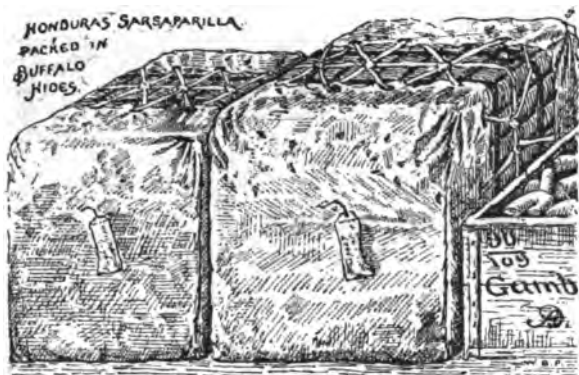
BENZOIN.

Gum benzoin is nowadays classed under four varieties. The most valuable is the Siam gum, which is generally imported in cases, into which the drug is sometimes poured in a fluid state, while occasionally it is packed only after it has dried. When shown at the warehouse, the cases are emptied and their contents placed on the floor, separated by small boards. The most valuable Siam gum is that which appears in bold, pale, loose, flat tears of a pale orange coat and milk-white fracture; but this variety is rare. The quality next in value is that which appears in an agglutinated mass of tears, or "almonds," rather dark in color; and the third grade consists of small or dark tears, either separate or agglutinated, and of a color varying from cinnamon to dark brown. A case of Siam benzoin weighs from 1 to 2 cwt. Sumatra benzoin is of a gray or dark-brownish color, more or less interspersed with tears, but occurring always in solid blocks wrapped in gunny, which is put in the case to prevent the gum from amalgamating with the wood. This gum is nearly always more or less "false packed," the sides or corners consisting of earthy matter, and hence one case out of every parcel is cut transversely, as shown in our



sketch, in order to detect adulteration inside. Formerly the weight of a case of Sumatra benzoin was generally from 1½ to 2 cwt., but of late small boxes, weighing sometimes only one-half cwt., have become frequent. Penang benzoin is less frequently met with. In appearance it stands nearest to Sumatra, but yet it possesses an odor and color distinctly *sui generis*. Palembang benzoin consists usually of a more or less earthy mass studded with almonds of an orange color. It is usually packed in cases of from 1½ to 2 cwt., but within the last few years it has been imported frequently in small tins of about 14 pounds, 8 of which make up a case. The Palembang gum is mostly used in the manufacture of benzoic acid, of which it contains a larger percentage, in proportion to its value, than any of the other varieties. All benzoin, except the Siam gum, is produced in the island of Sumatra. The demand for Sumatra gum has very much increased of late, and quite three times as much is imported now as was the case twenty-five years ago.

Penang gum has only been seen in the market during the last fifteen years or thereabouts, and Palembang gum is of still more recent date.



SARSAPARILLA.

Sarsaparilla is an exceedingly bulky drug, and may be seen heaped up in huge bundles in the background of the show room. The varieties now almost exclusively seen



on the London market are Honduras, Mexican, Guayaquil, red or native Jamaica, gray Jamaica, and "Lima" or "Lima Jamaica." In appearance Honduras sarsaparilla is certainly the most attractive. It is packed in long bundles about 3½ to 4 feet long, and weighing generally 2 pounds each, about 80 of which go to make up a seron, as shown in our sketch. The serons are covered at the top and bottom with a piece of

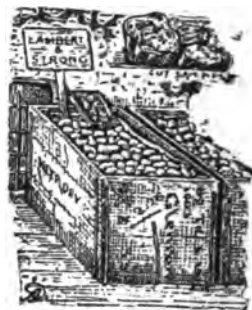
cowhide, and fastened together by means of thongs of the same material, strength having been previously given to the parcel by fastening it round with a few iron hoops. The distinctive "brand" of the Honduras sarsaparilla is generally branded in the hide.

There are about twenty such brands in commerce, but only about half a dozen are regularly met with in the London market.

The color of Honduras sarsaparilla varies from bright orange to dull brown; and as it is one of the "mealy" varieties, the starchiness of which is one of the principal tests of its value, small pieces are longitudinally cut out of the bundles at different places to show the character of the root. Guayaquil sarsaparilla is less valuable than Honduras; it arrives in large, rough bundles or hanks of 3 to 4 pounds, and is of a coarse and stout texture. Mexican sarsaparilla is the lowest priced variety of all. It arrives in long, dull brown pieces made up into bales, and showing large pieces of the chump which has been cut off along with the root. So-called gray Jamaica sarsaparilla, the variety almost exclusively used in this country, has no longer any connection with the island of that name, but reaches New York direct from Central America, where it is produced, and is shipped to us from the States. In regard to neatness of packing it is second only to Honduras. The bundles weigh about 2 pounds; they are barely 1½ feet long, and made up of several roots folded four or five times, and fashioned into a bundle by being wound round with the end of one of the roots. The color of this sarsaparilla varies from dull gray to iron brown, the latter kind being generally preferred; and much value is also attached to the fibrousness of the root. The so-called "native" Jamaica sarsaparilla, as a medicinal root, does not date back more than a generation. Its color varies from pale yellow to deep orange, and the small quantities thrown upon the market always find a ready sale. The weight of an original package of Honduras sarsaparilla averages about 180 pounds, of gray Jamaica also 180 pounds, and of Mexican runs from 200 to 250 pounds.

RHUBARB.

Rhubarb is imported in tin-lined cases varying in weight from 180 to 300 pounds, sometimes even less. It is usually divided by the druggists into Shensi and Canton roots, which are almost always sun-dried and high-dried or kiln-dried root. The Shensi root is the most valuable variety, while high-dried ranks lowest. Rhubarb is exceedingly liable to become wormy, and it is by no means an unusual occurrence to find that considerably less than half the number of chests placed on show consist of sound root. The quality of the drug has greatly deteriorated of late, and very little trouble is now taken by the Chinese in the curing and trimming of the root. Rhubarb upon its arrival in London is "bulked"—i.e., a whole parcel emptied on a heap, and picked over by hand according to size and quality before it is again transferred to the cases, which are generally coated outside with a yellowish paper, and are not unlike tea chests in appearance.



MUSK.

A short flight of stairs affords communication between the rhubarb warehouse and the musk floor. Our sketches give a general idea of the manner in which the musk is placed on "show" every alternate Wednesday, one tin representative of every pile being emptied into a small wooden trough to enable



GRAIN MUSK.

buyers to judge of the character of the pods. The large musk pod illustrates

a pod of Tonquin musk of the so called "old-fashioned" kind—i.e., still having the skin adhering to it. Of recent years it has become more usual to take off the hairy outer skin from the pods before they are exported from Shanghai. Grain musk is mostly imported from India in bottles and pickle jars of various shapes and sizes. There are two or three firms, however, who put up their grain musk in bottles of a somewhat original character, elaborately labelled and sealed; one such bottle is shown in our sketch. As a general rule the quality of the grain musk imported into this

country from India and China is not of the purest, though, of course, there are exceptions—so rare as to prove the rule beyond doubt.

During the greater part of this year the musk market has been greatly depressed in consequence of the introduction of coal-tar musk into commerce, but there are signs that the trade in this drug is again entering upon brighter days.

ESSENTIAL OILS.

East Indian sandalwood oil arrives here in huge copper pots, protected by a strong netting of ropework. A pot usually contains about 20 gallons of very turbid oil. The oil is therefore emptied from the pot into large copper "jacks" or vats, about 5 feet high and quite 3 feet in diameter, and left to settle. The "jack" is provided with two taps—one about 12 inches from the bottom being used to draw off the clarified oil, while the lower tap allows the thick dregs to run out. The latter are sold separately. Indian rose oil is treated in the same manner, and so, in fact, are many other essential oils stored at this warehouse. Rose oil is imported in metal drums provided with a handle and a bung-hole at the top. These tins—usually old kerosene tins—are used for packing quite a large number of Eastern drugs which come into this market.

In close proximity to the oils is found East Indian nutmeg paste, in tins weighing about one-half cwt. each, four or six of which make up an original case.

Cinnamon sawdust is often used for stuffing between the bottles or other breakable packages inside cases of essential oils. Citronella and lemongrass oils were formerly imported almost exclusively in bottles of about 21 ounces each, 24 or 36 in a case. Under this mode of packing they were liable to considerable damage, and recently an innovation has been introduced by the importation of these important articles in 5-pound tins. Quite lately the oils have been shipped in so-called "tanks," heavy iron casks protected and kept from rolling about by a strong wooden crate. The tanks have evidently been sent to

Ceylon as containers for a different liquid, and are returned to us filled with oils.

IODINE.

The iodine rooms are strongly impregnated with the odor of the drug, and all the woodwork and other fixtures are thoroughly soaked with its reddish-brown evaporations. The vapor of the iodine often also affects the workmen physically. When Chilian iodine first came into our markets, about twenty-five years ago, it was stored exclusively at Fenchurch street warehouse. It was then shipped in small gunpowder kegs, weighing about three-quarter cwt. each, strongly secured by six iron hoops. The iodine, however, corroded, and spoilt both wood and iron work in an incredibly short time; and it happened on more than one occasion that the iron hoops of a keg burst and the contents were thrown all over the room. About the only material which was found not to be affected by iodine to any considerable degree was thick brown paper, and with this, therefore, the kegs were generally lined inside. At the present time iodine is imported in tierces, into each of which five little kegs are packed, three being put at the bottom of the tierce and the two others placed horizontally above them. The space between the kegs is filled up with straw. The top and bottom of every keg are protected by pieces of undressed cowhide, but these are taken off the kegs upon their arrival in London, and the pieces of hide, strongly impregnated with iodine, are always bought up at about 6d. per piece and shipped to Germany. Out of every parcel of iodine one or more kegs are opened and weighed to ascertain the tare of the lot.

Note on American Lithia Waters.

PROF. E. WALLER, of the School of Mines, Columbia College, has published a paper on the "Determination of Lithia in Mineral Waters" (in *Journ. Am. Chem. Soc.*, June, 1890, vol. xii., 214), in which, after discussing the methods at present in vogue for determining lithia, and presenting his own observations and modifications, he takes occasion to put on record some facts regarding certain American lithia waters which are rather surprising, inasmuch as they are not in accord with what has been reported heretofore regarding these waters. We quote the author's own words:

In order to test these methods upon water containing lithia, samples of several of the best known and widely advertised waters were purchased and submitted to examination.

The results were somewhat surprising, and showed unquestionably that either the original analyses, on the strength of which those waters are now sold, were erroneous on account of imperfection in the methods used, or, what is more probable, that the proportions of lithium in those waters are liable to great fluctuations.

The results given were chiefly obtained by Carnot's fluoride method, but were in several cases confirmed by the use of other methods. The most scrupulous care was exercised to be sure of obtaining all of the lithium in the waters under examination, the spectroscopic indications having been used at every stage of the process.

In the Farmville Lithia Water, purchased at the office of the company, no lithium could be detected by the spectroscope on moderate amounts of the water. On evaporating 8 liters of the water, and treating in the manner described for the concentration of the lithia into a solution of small bulk, a lithia line was obtained in the spectroscope, but the amount was found to be too small to permit of a quantitative estimation. The experiment was repeated with 10 liters of the water, with essentially the same result.

With the Buffalo Lithia Water the reaction for lithium was more distinct when considerable quantities of the water were concentrated. From 20 liters of the water was obtained lithium sulphate corresponding to 0.0185 part of LiHCO₃ per 100,000.

In the Londonderry water the lithia reaction could be obtained without great difficulty. Analysis of the water purchased by myself showed a little over 4 parts per 100,000.

The company puts up some of the water in half-gallon bottles not charged with CO₂, and also some in pint bottles (called in their circulars "sulphocarbonated") which is charged with CO₂, and has also received the addition of some salts. The amount of salts added appears to be somewhat irregular.

For instance, the following results were obtained (results given in parts per 100,000):

	Total Solids.	Loss on Ign.
Londonderry half-gallon bottle average.	87.35	2.25.
" pint bottle A	149.4	4.9.
" " B	104.2	4.5.
Average of eleven others	234.7	6.4.

The variations in the eleven bottles were 221.3 to 234.4 for total solids.

The proportion of lithium was essentially the same as for the still water.

I was told that several lots of water purporting to come from these springs had at times appeared on the market in which no lithia could be detected.

As I learned that Dr. Endemann had obtained some water of that kind, I requested him to send me a bottle. He complied, and although the bottle bore all the labels and marks similar to those purchased by myself, no lithia could be detected in it. The water contained 5.2 parts total solids per 100,000. I have heard of others who had similar experiences.

I naturally desired to obtain samples of these waters direct from the springs, taken by some one whom I knew to be disinterested. Attempts thus far have been unsuccessful.

In the case of the Londonderry Springs, all access is denied to visitors, and applications for water are referred to the bottling establishment in Nashua.

Of all the waters examined purporting to be natural, the Saratoga Hathorn proved to be the strongest in lithia. The result of tests on this water are not at present in such form that they can be here recorded, but it suffices to say that the water contains fully as much as the analyses call for (12 to 14 parts LiHCO₃ per 100,000, corresponding to 7 or 8 grains per U. S. gallon).

Tests were also made on the waters manufactured and sold by Carl H. Schultz as containing lithia. They were found to contain a little more lithia than claimed—*e. g.*, the formula on his "Vichy with lithia" calls for an amount corresponding to about 57 parts LiHCO₃ per 100,000; the analysis showed 60 to 62 parts.

The results enumerated may be thus tabulated:

DESIGNATION OF WATER, ETC.	Total solids per 100,000.	Loss on Ign.	Non-Volatile.	Used for Determination.	LiHCO ₃ .		
					Per 100,000.	Grains U. S. Gal.	Grains Imp. Gal.
Farmville Lithia half-gallon bottles.	16.4	1.1	15.8	8 lit.		Traces.	
do. do.	...	....	....	10 "		Traces.	
Buffalo Lithia half-gallon bottles.	93.2	6.5	88.7	20 "	0.0185	.0011	.0018
Londonderry Lithia half-gallon bottles.	37.35	2.25	35.1	10 "	4.171	2.432	2.920
do. do.	...	....	....	10 "	4.075	2.376	2.852
do. do.	...	....	....	2 "	4.180	2.408	2.891
Londonderry half pints (with CO ₂).	...	....	....	2 "	4.129	2.407	2.890
do. do.	...	....	....	4 "	4.074	2.376	2.851
Londonderry Lithia half-gallon (Dr. E.)	5.1	1	4.1	1 "		None.	

Quantitative Separation of Arsenic and Antimony.

In his "Handbuch der Analytischen Chemie" (sixth edition, 2, 423), Rose mentions a method of separating arsenic and antimony by precipitating both with sulphuretted hydrogen, and then gently warming with concentrated hydrochloric acid. The antimony trisulphide is alone dissolved. Some of the arsenic trisulphide is, however, apt to be dissolved as well.

According to O. Koehler (in *Arch. d. Pharm.*, 227, 406) good quantitative results can be obtained by careful attention to concentration and consequent prevention of the precipitation of the antimony. Small quantities of arsenic were taken in presence of large quantities of antimony. The antimony trichloride solution used had a spec. grav. of 1.33, the concentrated hydrochloric acid was of spec. grav. 1.124, and the solution of arsenious acid contained 1 Gm. of arsenious acid per liter.

It was found that to 1 part of the antimony solution at least 2 parts of the concentrated hydrochloric acid were necessary to prevent precipitation of the antimony by sulphuretted hydrogen from a hot solution.

For the separation, 20 C.c. of the antimony trichloride solution were mixed with 45 C.c. of concentrated hydrochloric acid and 5 C.c. of the arsenious acid solution; into the hot solution sulphuretted hydrogen was passed.

The arsenic trisulphide was then filtered through a filter moistened with hydrochloric acid, and was subsequently washed with dilute hydrochloric acid (1:3). Finally, in order not to have to remove the hydrochloric acid with water, the precipitate was oxidized in a beaker with bromine water, the residue was filtered off and washed with ammonia, and to the filtrate ammonia was added. The arsenic was then precipitated with magnesia mixture and allowed to stand for some time (see Fresenius, "Quant. Anal.," sixth edition).—*J. Soc. Chem. Ind.*

Benzosol is the name of a benzoic acid ester, prepared from guaiacol, and introduced into materia medica as a substitute for this latter substance in the treatment of phthisis, its claims to superiority resting upon a less disagreeable taste. It occurs in the form of colorless crystals melting at 50° C., nearly insoluble in water, easily soluble in hot alcohol, chloroform, and ether; when pure it is nearly tasteless and odorless.—*Chem. and Drugg.*

Colorimetric Method for Estimating the Morphine Strength of Laudanum and Other Preparations of Opium.

BY S. J. HINSDALE, FAYETTEVILLE, N. C.*

PREPARE an official tincture of opium with assayed opium. You will know the morphine strength of this tincture.

Make three dilutions of it with dilute alcohol, as follows:

- 1) 8 parts tincture and 1 part dilute alcohol.
- 2) 2 " " " 2 " " "
- 3) 1 " " " 3 " " "

Put 12 C.c. of the tincture and of the dilutions in vials, and add to each 12 C.c. dilute alcohol; cork well and keep them as standard dilutions of known strength. Label them Nos. 1, 2, 3, and 4. Let the dilute official tincture be No. 1. Dissolve 0.04 Gm. potassic ferricyanide in 500 C.c. water, and add to it 15 drops Liquor ferri chloridi. Call this *ferricyanide mixture*. (*This must be freshly prepared*, as it will be partly decomposed in a few hours.) Prepare it in a glass-stoppered bottle with water entirely free of iron.

Place four 50-C.c. clean glass tumblers or wine glasses on a white surface, and deliver *with a pipette* (about one-third filled) 1 drop of the dilution in the glasses, commencing with No. 4 (the weakest), blowing out the pipette after each dropping. (The pipette should be about 4 inches long, and made of one-quarter inch tubing, and should deliver drops of the dilutions weighing *about* 0.016 Gm., or one-fourth grain. To test the pipette, see how many drops will balance a 0.200 Gm. weight. The reason for using so small a drop, and for diluting the tincture, is because a full drop of the undiluted tincture would develop too deep a blue color.)

Now add to each glass about 5 C.c. ferricyanide mixture (it is convenient to use a homœopathic vial as a measure), and in about one minute add 15 or 20 C.c. water, and observe the shades of color. This observation must be made *within five minutes*, as the air and light will soon cause all to be uniformly blue.

By comparison with the shades of color produced by these standard dilutions you can easily estimate the strength of any sample of laudanum with much accuracy. The sample must, of course, be diluted with an *equal part of dilute alcohol*. The presence of tannin interferes with this method, but opium does not contain tannin. Tannin is easily detected with a solution of a salt of iron. The ferricyanide mixture *must be freshly prepared* and the glasses must be *clean and clear*, as the slightest bluish tinge interferes. Wash them with caustic soda and then with hydrochloric acid, and rinse, if they are soiled with Turnbull's blue.

The ferricyanide mixture is probably the best confirmatory test for morphine. If 1 drop of water containing 0.000001 Gm. of morphine is mixed on a white slab with 1 drop of the ferricyanide mixture, a blue color will be developed within *one* minute. With water alone the mixture will become of a bluish shade in about *ten* minutes, owing to the action of air and light.

P. S.—To estimate the strength of vinous or aqueous compounds of opium, they must be brought to about the same specific gravity as the "standard dilutions" with alcohol, that the drops may be uniform in size.

A Bogus Physician in a Vienna Hospital.—A discovery took place the other day at the second largest hospital in Vienna which is mildly stated to have created "a disagreeable impression" in medical circles. It was found that an individual who had been engaged in the hospital for over a year as a medical practitioner, and during that period had attained the second rank of the hospital staff, with a fair prospect of becoming senior physician in due time, possessed no genuine medical qualifications whatever, and had gained admission on the strength of a *bogus testimonial* from the University of Innsbruck, in the Tyrol. The most astonishing part of the story is that it has now transpired that the bogus physician was grossly ignorant of the science of medicine and unable to write a prescription correctly.—*Chem. and Drugg.*

Atropine as an Antidote to Cyanide of Potassium.—A clerk in a business at Halle (Germany), who had made a pleasure trip to Leipzig with the money of his employers, on his return resolved to commit suicide to avoid exposure. He succeeded in procuring a quantity of cyanide of potassium solution, and also of atropine solution, which he swallowed in rapid succession. Beyond a few passing fainting fits, however, he was none the worse for his suicidal attempt, and after a few days' hospital treatment the would-be suicide had completely recovered his health, no antidote whatever being administered to him. It is thought that the atropine solution acted as an antidote to the cyanide.—*Chem. and Drugg.*

* The author offers this as an improvement of the method proposed by him some years ago for the same purpose. See *Am. Drugg.*, 1888, 121.

The Purification of Artificial Salicylic Acid.

WITHIN the last few years the employment of salicylic acid, both as an antiseptic and for pharmaceutical purposes, has become very general, and the quantity of this substance manufactured for various purposes is now very considerable.

There is a pretty large difference between the price of the "natural" acid, obtained from oil of wintergreen or from salicin, and that of the "artificial" acid, synthetically prepared from phenol, and the natural result is that the artificial is used instead of the natural acid for many purposes. It has been observed, however, that the administration of the former (usually as a sodium salt) as a medicine is often followed by disturbances more or less severe, and sometimes of a grave nature, and it has recently been proved that these serious after-effects are due to the presence of impurities in the artificial acid, and are not produced by use of the natural acid.

Professor Charteris, of Glasgow University, has carried out a series of comparative experiments on rabbits, using on the one hand the natural acid and its sodium salt, and on the other hand a number of specimens of the artificial acid and its sodium salt which were obtained from various sources.

The results of these experiments may be summarized as follows:

Salicin in 30-grain doses, natural salicylic acid in 10-grain doses, and sodium salicylate (from the natural acid) in 32-grain doses, have no deleterious effect on rabbits weighing 2½ pounds.

Artificial salicylic acid in 10-grain doses, and sodium salicylate (from the artificial acid) in 18-grain doses, in ordinary use, cause the death of rabbits weighing 2½ pounds. Even the very best specimens of the artificial acid (sold as "chemically pure"), in 15-grain doses, proved fatal to one rabbit, and in two others caused marked prostration and paralysis, but not death, while with less pure specimens a fatal result followed the administration of the acid in every case.

From these experiments it is evident that serious objections may be raised to the use of ordinary artificial salicylic acid for medical purposes, but the comparatively high price of the natural acid makes the production of a pure artificial acid very desirable. I therefore, at Dr. Charteris' request, made a number of experiments with the view of testing the possibility of so purifying commercial salicylic acid that it may be used with safety instead of the natural acid, and after trying various methods I find that the purification can be effected simply and economically by the process suggested by Williams some years ago (*Pharm. J.*, 3d S., 8, 785). A hot aqueous solution of the acid is neutralized with calcium carbonate and allowed to cool, when calcium salicylate, which is sparingly soluble in cold water, separates out in hard, glistening crystals. When the best specimens of the commercial acid are used, the crystals of the calcium salt are well formed and almost colorless, or only slightly tinged with brown, while inferior qualities of the acid yield a mass of indistinct brown crystals of the calcium salt.

A further quantity of the salt, of course in a more impure state, is obtained on concentration of the mother liquor, and the greater part of the impurities is contained in the last mother liquor, which is usually rather thick and of a dark reddish-brown color.

The calcium salt is recrystallized from hot water once, or oftener if necessary, and finally decomposed by hydrochloric acid, and the salicylic acid thus set free is washed with cold water and crystallized from dilute spirit. It is now obtained in large, well-formed, prismatic crystals, which are exactly similar in appearance to the crystals of the natural acid, and the melting point, solubility, and other properties of the two substances are exactly the same.

The physiological action of the purified acid was investigated by Dr. Charteris with satisfactory results, for it was found that after administration of the acid in 15-grain doses there was "no paralysis," not even depression, after the last injection; rabbit able to run easily.

The impurities found in commercial salicylic acid are chiefly cresotic acid, which results from the use of impure phenol in the manufacture, parahydroxy-benzoic acid, and hydroxy-isophthalic acid.

The presence of the two latter substances is due to the use of caustic soda containing potash, or to undue raising or lowering of the temperature during the manufacture, as has been shown by Fischer in an interesting paper (*J. Pharm.*, [5] 20, 258) in which methods for estimating the amount of the impurities in salicylic acid are also described. None of the specimens which I examined contained more than a very small quantity of impurity; this was separated from the last mother liquor by addition of hydrochloric acid, conversion of the precipitated acids into calcium salts, and fractional crystallization of the latter, and consisted principally of cresotic acid (melting point, 151°).

It was found that one grain of this impurity was sufficient to cause the death of a rabbit weighing 2 pounds.

It is troublesome to detect the presence of the impurities, in the better specimens of commercial salicylic acid, by

direct tests, for the quantity of these impurities is usually too small to exercise an appreciable influence on the melting point or the solubility of the acid, but the crystalline form of the acid is a reliable indicator of its purity. As stated above, the pure acid crystallizes from dilute spirit in large and distinct crystals, but the presence of even a very small quantity of impurity causes the acid to crystallize in a network of delicate, closely interlacing needles.

It is therefore a comparatively simple matter to manufacture a pure salicylic acid—indeed, I understand that this is now being done—and in view of the dangers attending the use of an impure acid it seems reasonable that some measures should be taken to insure the purity of the acid used for pharmaceutical purposes or in the preparation of preservatives of different kinds.—G. G. HENDERSON in *J. Soc. Chem. Ind.*

Cooling Ointments and Creams.

THE medical man frequently desires to prescribe a cooling ointment as an application to various burning skin diseases, and it has long been felt that there was room for a better preparation than the old "Cremor refrigerans." This better preparation is indicated in a paper by Unna on cooling salves and ointments. He finds, although simple lanolin ointment, even when containing more than its own weight of water, is not permanently cooling, but rather the reverse, that a mixture of one part of lanolin with two of benzoated lard and three of water far surpasses in its effect any "cold cream" or ointment yet made. A mixture with rose water instead of plain water he recommends as a substitute for ordinary cold cream, and proposes to make a cooling lead or lime ointment for various skin affections by substituting for the rose water Liq. plumb. subacet. or Aqua calcis—always in the same proportions.

The place of ordinary zinc ointment can be advantageously filled by an Ung. zinci refrigerans, which consists of lanolin 10 parts, Ung. zinci benz. 20 parts, and Aqua rosæ 30 parts.

Of course it is quite possible to combine the cooling effect with what may be distinguished as a true medicinal or specific action. Thus, a cooling ichthyol ointment, of great value in the treatment of rosacea, may be prepared from lanolin 10 parts, benzoated lard 20 parts, distilled water 24 parts, and ichthyol 6 parts.

There is also a demand for cooling preparations which more closely approximate to cream in consistence. These are required to cover large surfaces of the skin as a thin layer, without the application of mechanical power, and to leave sufficient fat behind, as the aqueous constituent evaporates, to keep the skin moist and supple. Particularly in these creams, largely used for toilet purposes, lanolin shows its great superiority over glycerin fats. A true "cold cream" is made by mixing together 10 parts of lanolin with 20 of benzoated lard and 60 parts of rose water. The "Cremor refrigerans aquæ calcis" is made by substituting 60 parts of lime water for the rose water, that of plumbi subacet. by using an equal volume (60 parts) of the liquor.

The author recommends that these preparations should be made up in small quantities at a time, as they are not so constant as lanolin unguenta of the ordinary kind. The ointments naturally keep better than the creams, but even these are better freshly prepared.—*Monthly Magazine.*

Fluoroform.

Two parts of iodoform, 2 parts of silver fluoride, and 1 part of chloroform are mixed in a flask, which is cooled to 0°, and is connected with a lead worm kept at 23°, followed by a U-tube containing silver fluoride heated at 100°. The temperature of the flask is allowed to rise gradually, and the gas which is evolved is collected over mercury.

It is purified from chloroform vapor by prolonged contact with fragments of dry caoutchouc, and from carbonic oxide by means of a solution of cuprous chloride in hydrochloric acid.

The product is a colorless gas with a pleasant odor resembling that of chloroform. It burns with difficulty, with a blue flame and abundant evolution of hydrogen fluoride. It is only slightly soluble in water, chloroform, or benzene, but alcohol dissolves about five times its own volume.

Its sp. gr. is 2.445, and it liquefies under a pressure of 40 atmospheres at 20°. If the pressure is suddenly released it solidifies.

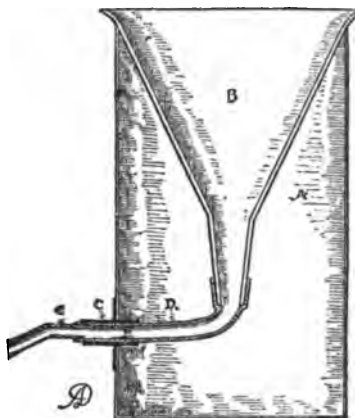
This gas is fluoroform, CHF₃. When heated with alcoholic potash at 160° it yields potassium formate and fluoride. Sodium heated in the gas burns brilliantly, with deposition of carbon and sodium fluoride and formation of methane.

When silver fluoride and iodoform react in absence of chloroform, much heat is developed, iodine is liberated, and a fluoroiodoform is produced.—M. MESLANS, in *Compt. Rend.*, 110, 717-719.

A CHEAP FUNNEL JACKET.

THE appliances in the market for keeping solutions hot while being filtered are a water jacket of tin or copper, and a funnel let through the ordinary water bath.

With the tin jacket there is no means of drying it after use, which means rapid corrosion by rust, while the copper article is too expensive. The only objection I have to the water-bath jacket is the large quantity of water to be heated when the bath is used for filtering alone.



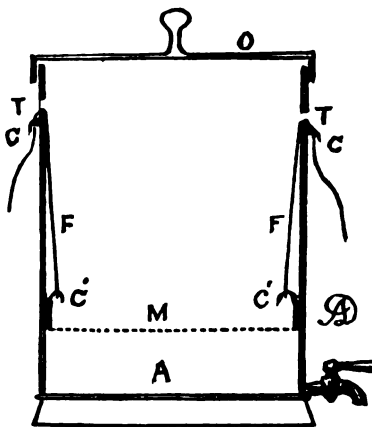
A, tin box, round or square. B, funnel. C, brass tube, with collar soldered into A. D, tubing stretched over end of funnel and fitting accurately into C. E, glass tube fitting tightly into D.

Some time ago I devised the hot funnel shown in section above, and find it to answer the purposes of a hot-water funnel jacket. The funnel being in direct contact with the water, its contents are much more rapidly heated than in the case of the ordinary jacket with its intervening tin or copper. One drawback, however, is its fixity when in use—the funnel cannot be removed without emptying the bath.

The whole thing can be put together in the back shop at the expense of a little time and patience. The one I have in use was made out of an old vaseline tin, the brass tube being the neck of a disused spirit lamp.—J. A. FORRET in *Chem. and Drugg.*

APPARATUS FOR INTERMITTENT PREPARATION OF SYRUPS BY THE COLD METHOD.

CERTAIN syrups are not used so frequently as to warrant the use of a continuous apparatus, and for such Mr. Bouvet, a pharmacist of Autun, recommends the following in the *Répertoire de Pharmacie*: A cylindrical vessel, A, of copper, tinned iron, or enamelled iron, having a diameter about equal to its height, is provided with a faucet near its bottom. Near the top it has four small holes, T, below each of which on the outside is a small hook, C. A cover, O, is also provided. A diaphragm, a trifle smaller



in its diameter than the cylinder, has a bottom, M, of fine wire cloth, and to its upper edge are attached four hooks, C', to which are attached the strings F which are passed through the holes T and fastened about the hook C.

To make a syrup, the diaphragm is lowered to the bottom of the vessel, and into it are then placed the sugar and the proper amount of liquid called for by the formula. When the sugar has settled, the diaphragm is to be raised to the upper surface of the liquid, to remain until the sugar is completely dissolved, after which the syrup may be drawn off and filtered. By this means the sugar is always in contact with the portion of the liquid which is the least saturated, and is rapidly dissolved.

Amorphous Phosphorus.

MR. ALEXANDER PEDLER has made an exhaustive study of the action of light upon phosphorus, and, in connection therewith, of the properties of amorphous phosphorus. He has found that many statements regarding the latter, found in the text books and works of reference, require modification and correction. We give in the following an abstract of his paper (after *Journ. Chem. Soc.*, 1890, 599), so far as it is of interest to our readers.

The term amorphous phosphorus itself appears to be misleading and practically incorrect, and from the careful microscopic examination of eight samples of amorphous phosphorus, some obtained from England and some from Germany, it has been shown that in all the samples examined the great bulk of the powder consists of transparent, ruby-red, more or less crystalline particles, which have a decided action on polarized light, indicating that most probably they are not amorphous.

By careful elutriation commercial amorphous phosphorus can be divided into a very fine powder of very decided red color, and into almost black, shining particles. The latter, under the microscope, are practically all transparent, giving a ruby-red light, and seem to be crystalline in nature from their action on polarized light. In the finer powder the crystalline form is not so well marked, but many of the particles are transparent, allowing a ruby-red light to pass through, and they also act fairly strongly on polarized light.

The red powder, when heated with dilute sodic hydrate solution, yields slight but distinct amounts of phosphuretted hydrogen, and the same powder, after having been much more finely powdered and treated with the same solution of sodic hydrate, yields a larger amount of phosphuretted hydrogen. The dark, more or less crystalline particles yield no phosphuretted hydrogen. On being boiled with a solution of sodic hydrate of the same strength as used in the last experiment, but after these coarser particles had been powdered extremely fine, and the very finely divided powder treated with the same solution as before—namely, that with which the coarse powder had previously refused to give phosphuretted hydrogen—a rather large amount of phosphuretted hydrogen was evolved. At the same time the action of powdering the coarse particles was to render the almost black color a distinct red-brown. The action of sodic hydrate solution on the so-called amorphous phosphorus, therefore, is evidently, to a certain extent, dependent on the state of division of the phosphorus, though ordinary commercial amorphous phosphorus is supposed to be unacted on by sodic hydrate solution, as the latter is used as a method of purifying it from ordinary phosphorus. It might be said that ordinary phosphorus may have been present in the amorphous phosphorus; but this point was carefully inquired into, and absolutely no ordinary phosphorus could be detected.

The methods used were solution by carbon bisulphide, and also heating the amorphous phosphorus in a vacuum to a moderate temperature for long periods, when ordinary phosphorus, if present, would have sublimed, as in Hermann's experiments (*Ber.*, 6, 1415).

Another property of amorphous phosphorus is said to be that at a temperature of 260° C. it is converted, or begins to be converted, into ordinary phosphorus. The following experiments were made on this point: Seven samples of commercial amorphous phosphorus, some from England and some obtained from Germany, and one sample of rhombohedral phosphorus, were heated at 305°–310° for two hours. No signs of any change could be detected in the phosphorus. The same eight samples were heated in a bath of melting lead (temperature 326°), and no change could be detected. The same eight samples were heated in the vapor of boiling mercury for a short time (temperature 357.25°), and no change could be detected. The same eight samples were heated in the vapor of boiling mercury for a short time (temperature 357.25°), and no change could be detected; but when heated in the vapor of boiling sulphur (temperature 445°), it was found that, although the samples of phosphorus did not appear to undergo any reversal, yet a certain amount of vapor passed away from the surfaces, which vapor was oxidized on coming in contact with air. The boiling point of ordinary phosphorus is said to be 290°, so that the temperature of the bath in this instance was about 155° above the boiling point of ordinary phosphorus.

Amorphous phosphorus is also generally stated to be quite permanent in the air. Thus Roscoe and Schorlemmer say ("Treatise on Chemistry," 1, 470): "This substance (red phosphorus) can be exposed to the air for years without undergoing any alteration." It is, however, known that some samples of amorphous phosphorus become damp on exposure to air, and Groves (*Pharm. J. Trans.* [2], 6, 643, and "Watt's Dict. Chem. Suppl.," 954) has shown that the oxidation may sometimes go on to a considerable extent. In text books, however, the oxidation of amorphous phosphorus is referred to the presence of ordinary phosphorus, and thus Roscoe and Schorlemmer again say (p. 471): "All the commercial amorphous phosphorus, however, contains traces

of the white modification, and this undergoes oxidation in the air, so that the mass always has an acid reaction, owing to the formation of phosphorous and phosphoric acids." In a very hot and very moist climate, like that of Calcutta, where all these experiments have been made, the rapid change or oxidation of commercial amorphous phosphorus is a very familiar phenomenon.

The experiment has been tried with the same sample of phosphorus four times in succession, by allowing the sample to oxidize, then removing the oxidized products by careful washing, then drying; and on standing oxidation has recommenced, as stated above, on four successive occasions.

This in itself is probably a sufficient proof that the cause of the oxidation is not to be found in the small quantity of ordinary phosphorus which might have been present in the amorphous phosphorus as at first manufactured, for the successive oxidation would require a fresh existence of ordinary phosphorus in each case.

In order to set the question at rest, samples of very carefully purified amorphous phosphorus have been taken in which no trace of ordinary phosphorus could be detected, and which had been allowed to oxidize once, and the oxidized products removed; and yet when exposed to the moist climate of Calcutta in loosely corked tubes they have become moist and decidedly acid in reaction within the short space of six days only.

No sample of so-called amorphous phosphorus, prepared in the various ways as stated previously, has possessed wholly the properties of a true amorphous body, but all the methods of preparation, whether by the action of heat or light, yield a substance which is more or less transparent, and perhaps crystalline in its nature. So, also, all the numerous samples of commercial amorphous phosphorus examined appear to be distinctly of a crystalline nature.

It might be said that the definite crystalline form of phosphorus in this condition should be capable of being determined, but phosphorus generally, in respect to crystallization, appears to be an abnormal body, as was found by Hermann (*Ber.*, 6, 1415).

It would, therefore, appear that the term amorphous phosphorus, applied to the substance, is a distinct misnomer; and so far from commercial amorphous phosphorus constituting a separate allotropic modification of this element, the conclusion arrived at from the work detailed in this paper is that the so-called amorphous phosphorus is really the same as the allotropic form called rhombohedral or metallic phosphorus, the very slight differences in character noticed between the substances in question being explained by the difference in the state of division and the slight differences in property due to their mode of formation.

Whether the term amorphous phosphorus also can be truly applied to the forms of allotropic phosphorus made by the action of light, is open to grave doubt; for, even in these cases, there appear to be distinct evidences of crystalline form, though it is true that a form of phosphorus which appeared to be amorphous was obtained in some of the experiments. Practically, however, it is believed it would be better to altogether discard the use of the term "amorphous" phosphorus.

Why Thunder Storms Affect Milk.

DURING electrical disturbances it seems that cream and milk are put into a condition to sour easily. The probable cause of this is the formation of ozone, by the electric discharges.

The ozone is diffused through the air, and is believed to be the cause of the strong acid odor which prevails after the storm is passed.

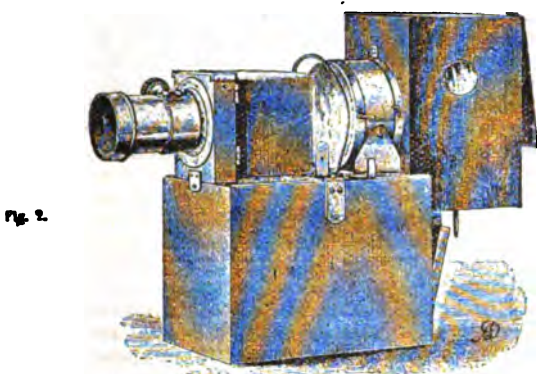
No doubt if the milk is submerged in water, and access of air is prevented, no result of the kind need be apprehended; and as the more milk is exposed to the air the more it will be affected by the ozone, the milk in open shallow pans will be acidified more readily than that in deep pails, although these may be open. In our long experience, however, says the editor of the *Cultivator* (Albany), we have never had any milk affected in this way, either in shallow pans or deep pails, and are of opinion that the heat of the air preceding thunder storms is more directly the agent in the souring of the milk than the ozone that may exist in the air after the storm is passed.

Carefulness to maintain a proper temperature by closing dairy houses and cellars against the outer atmosphere will be a means of safety.

Diuretin seems to give promise of being a really useful form of administering theobromine in a soluble condition, and several papers have recently appeared which demonstrate its value as a pure diuretic, which may be given in daily doses of 1½ to 2 drachms—best in solution with the addition of a little oil of peppermint or peppermint water, which is said to be an excellent corrective.—*Chem. and Drugg.*

IVES' ETHER-OXYGEN LANTERN.

A COMMITTEE appointed by the Franklin Institute recently reported very favorably on a new lantern, devised for microscopic and polariscopic work, screen illustrations, etc., in which the hydrogen of the oxyhydrogen lantern is replaced by ether. The novelty of the invention consists in this, that a current of oxygen gas is made to pass through a small metallic cylinder containing a porous material saturated with ether. The gas, thus impregnated with ether, reaches the burner, and there produces an intensely brilliant light, not inferior to that of the oxyhydrogen lantern. The material with which the cylinder is filled is a roll of cotton through which runs a zig-zag passage, which compels the current of oxygen to remain longer in contact with the cotton. Petroleum-



ether has been found to be preferable to the ordinary ether (so-called "sulphuric ether"), because it gives a somewhat more brilliant light and leaves no moisture or other products of combustion behind. If ordinary ether is used, the cotton in the cylinder must be taken out from time to time, to free it from alcohol and water. The flame it produces renders a smaller surface of the lime incandescent than is the case in the oxyhydrogen lantern, and for this reason a sharper image is produced.

The danger of explosion, when using Ives' apparatus, is very remote, and would at most consist in this, that the stoppers would be expelled from the cylinder or its tubulures.

Permanent Hypodermic Injections.

THE preparation of permanent hypodermic injections is a problem which has not yet been completely solved, and is not likely to be, because it is practically impossible to prevent forever the access of septic fungoid material to the injection. Still, a great deal may be done. From a recent paper on the subject by H. W. Jones (in the *Chem. and Drugg.*), we quote the following portion:

As antiseptic agents for the purpose we have had proposed glycerin, eucalyptus water, chloroform water, hydrate of chloral, thymol, carbolic acid, salicylic acid, boric acid, benzoic acid, etc. The addition of glycerin thickens the injection if added in sufficient portion to be reliable, and it renders it somewhat "messy," if not actually irritating. Eucalyptus water, boric acid, and benzoic acid are doubtful preservatives, failing entirely with some substances. Hydronaphthol in weak aqueous solution is decomposed by light, and throws down a brownish deposit. Thymol, chloral hydrate, chloroform water, carbolic acid, and salicylic acid remain as efficient preservatives. Of these, however, the writer would limit himself to three, viz.:

Salicylic water (made in the cold by saturation, and filtered).

Thymol (1 grain rubbed down with 4 ounces of water).

Chloroform water (P. B. strength); using, however, sufficient dilute hydrochloric acid (with chloroform water) to produce a faint acidity in the case of apomorphine injection.

Salicylic Water.—This cannot be used for making morphine injection, as the writer found the solution soon became charged with a crystalline deposit. On the other hand, it was found to be, after comparative trials with other substances, the best agent for eserine, and the sulphate dissolved in the salicylic water remains practically unchanged, the usual coloration scarcely appearing. Salicylate of eserine is well known as a stable salt, and for injections for the human subject it is sufficiently soluble (solubility, 1 in 140) to allow of its use; but, as eserine is very largely employed by veterinary practitioners, and as the salicylate is not sufficiently soluble to allow of a strength of 1 in 80, or even stronger, it is worth bearing

in mind how well salicylated water acts with the alkaloid in question in the form of sulphate, which is a most soluble salt and the one most generally met with.

Thymol Water.—This is a good preservative for ergotine, especially if the acid phosphates of potash and lime be first removed by neutralizing with ammonia. It also answers very well for other substances.

Chloroform Water.—This is possibly the simplest and best of all preservatives, and answers equally well for all kinds of injections, and for making a permanent solution of morphine leaves nothing to be desired. The color does not change, or only changes very slightly, on keeping, and no deposit forms. At least this is according to the experience of the writer.

As salts of the rarer alkaloids are now as easily obtainable as the alkaloids themselves, they are best bought in the combination required. The commoner stock alkaloids of every pharmacy may be converted into injections as under:

Aconitine (English), by dilute sulphuric acid.

Codeine, by dilute phosphoric acid.

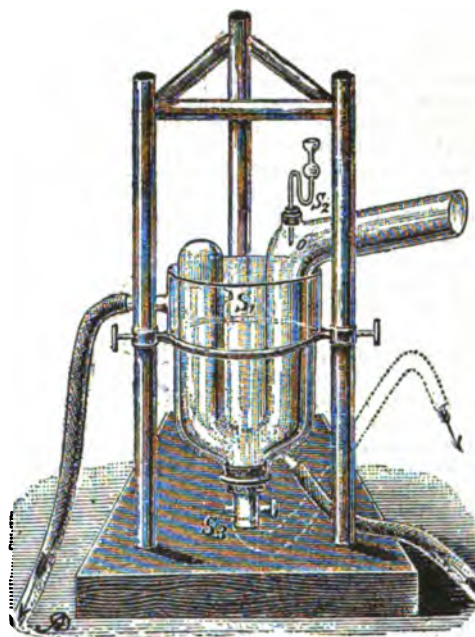
Strychnine, by dilute hypophosphorous acid.

Caffeine, by a strong solution of sodium salicylate (q.s.)

In each case using chloroform water, and adding the solvent very carefully to the alkaloid in the presence of a small portion of the water.

On the Active Principles of Insect Powder.

E. HIRSCHSOHN has found that the active principles of insect powder are not volatile. Much discrepancy exists among various authorities regarding the active constituents of the substance. Some of them regard the insecticidal principle to be volatile, whence it has been customary to direct the powder to be kept in closed vessels, and also to judge of its quality by its more or less fresh odor. Hirschsohn, however, found that insect powder, even when kept for five years in a paper bag, and having lost all odor, still retains its insecticidal powers. The author made special experiments in this direction, both with Persian and with Dalmatian powder. After heating both, during eight hours, to 120° C., they were found to have retained their activity, though they had lost their odor. This shows that the principle is not volatile. Nor was the activity of the powder diminished by neutralizing the acid constituent by ammonia. The insecticidal principle is soluble in alcohol, ether, chloroform, benzol, carbon disulphide, and petroleum-ether, but is insoluble in water. The active principle is shown not to be identical with pyrethrin by the fact that the root of pyrethrum (which also contains pyrethrin) has no action upon roaches or other insects.—After *Rundschau* (Prag.).



AN IMPROVED RECEIVER.

IN some cases it is desirable or necessary to surround the receiver with a cooling mixture, or to apply at least a stream of cold water to it in order to prevent evaporation and loss of the distillate. Carl Scharch recommends to use a receiver of the shape shown in the cut. It is U-shaped, has a safety valve at S₁, and an outlet at S₂. When more than one liquid condenses in the receiver, the heavier one may be drawn off below. If the lighter one is to be drawn off, a bent tube like that shown by the dotted lines may be fitted into the neck. The U-tube stands in an open vessel supplied with a stream of water.—*Zeitsch. f. ang. Chem.*

The Manufacture of Ammonium Chloride.

THE following is an abstract of a paper by Dubosc and Heuzey, published in the *Bull. Soc. Ind. de Rouen* (after *J. Soc. Chem. Ind.*), in which a method of manufacturing ammonium chloride is described which differs from that usually employed, but is said to be economical.

In the manufacture of gas from coal, ammoniacal liquors are produced which yield three commercial products.

1st, the crude liquor, density 4° to 5° B., containing about 4 per cent of NH_3 .

2d, the concentrated liquor, density 10° to 12° B., containing 12 to 14 per cent of NH_3 .

3d, crystallized ammonium sulphate containing 20 to 21 per cent of nitrogen, corresponding to 25 per cent of NH_3 .

These three products may be treated with metallic chlorides so as to yield ammonium chloride, the process varying with the product treated.

1. Treatment of the crude and concentrated ammoniacal liquors.

These liquors contain, besides ammonium sulphate, free ammonia, ammonium chloride and cyanide, a considerable amount of ammonium carbonate and sulphide, which precludes the possibility of conversion into chloride by the direct action of hydrochloric acid, which would give rise to large volumes of carbon dioxide and sulphuretted hydrogen.

The authors base their new process on the precipitation of the sulphur and carbonic acid by double decomposition with a mixture of the chlorides of iron and calcium in proper proportions, neither the sulphides nor carbonates of these metals being soluble in presence of ammonium chloride.

The originality of the method consists in using the mixture of iron and calcium chlorides; it has the advantage of (1) complete desulphurization, which is not possible with the use of calcium chloride alone, owing to the slowness with which calcium sulphide is formed; and (2) rapid precipitation of the carbonates as CaCO_3 , which does not take place in the presence of iron alone, as the colloidal carbonate of iron is then formed.

The process is carried out as follows: The gas liquors are freed from tar by being left for forty-eight hours in cisterns, and are then pumped up into a tank into the bottom of which the necessary quantity of the mixed chlorides has been already introduced. The mixture is stirred mechanically and left to settle for twelve hours. The upper two-thirds of the mother liquor are then perfectly clear and absolutely free from sulphide and carbonate. After being slightly acidified, if necessary, this portion is conveyed directly by pipes to the concentrating pans.

The precipitate, consisting of the mixed carbonates and sulphides of iron and calcium, is filtered on horizontal filters, or preferably in the filter press.

The dried residue forms an excellent purifying mixture for coal gas analogous to Laening's mixture.

The density of the liquors thus obtained is generally 7° B., and they must be evaporated down to 13° B. For this purpose the authors use flat iron pans made of strong sheet or cast iron, containing 2,000 liters. A close-grained cast iron wears best. The fire and pans are covered in entirely by a hood of silicated and stuccoed wood. All the joints are made tight, so that the vapors may be entirely carried off by a large flue into the main chimney shaft, where any sulphuretted hydrogen due to possible imperfect desulphurization is burnt by a special arrangement.

When the density reaches 13° B. the liquid is drawn off and left to crystallize in wooden troughs. It takes fifteen days to crystallize completely, the crust being broken each day. When acicular crystals of the ammonium chloride are to be produced, the operation is carried out exactly as above. If cubes be desired 5 per cent of a solution of perchloride of iron (density 35° B.) must be added to the mother liquors. This seems to act merely "by presence," and remains in the mother liquors. For certain chlorides used in galvanizing, manganese salts, or zinc salts, or fatty matters are added. When the crystallization is complete, the residual liquid is drawn off and pumped back into the evaporating pans, and the crystals are taken out, drained, and then either sent to a drying chamber whose temperature is 50° to 60°, or fritted in a reverberatory oven. Slaked lime is used to give the brownish-yellow color required in commerce, and the product is then packed in barrels.

To produce the refined salt, the solution is only concentrated to 11° B., then pumped into wooden troughs, and the metals it contains precipitated with ammonium sulphide. The liquid is then concentrated in vessels made of enamelled cast iron, and crystallized in earthenware pans. The crystals are drained and dried in the drying chamber.

As the enamel frequently splits off the cast iron pans, it must be replaced by a cement composed of dried calcium carbonate and potassium silicate, made insoluble by the action of hydrofluosilicic acid.

2. Treatment of ammonium sulphate by metallic chlorides.

The treatment varies with the nature of the chloride added.

1st. When the metallic chloride used yields an insoluble sulphate (e.g., Ca) on addition to the solution of ammonium sulphate:

The ammonium sulphate is dissolved in the smallest quantity of water possible. It is then pumped up into a trough placed at a certain height, into which the necessary amount of chloride has been previously introduced.

The mixture is stirred constantly, and when the reaction is complete it is sent to a special filtering apparatus, or to a filter press in which thorough washing is possible.

The filtered liquid is then concentrated in the manner previously described. The residue of calcium sulphate may be used for agricultural purposes.

2d. When the metallic chloride (NaCl , FeCl_3 , ZnCl_2 , MnCl_2) yields a soluble sulphate:

Any of the chlorides mentioned might be used, but the one actually employed is ferrous chloride. A solution of the crude salt (such as is produced in cleaning iron surfaces), of a density of 24° B. and containing 25 per cent of substance, is neutralized and pumped into caldrons, where it is heated to over 60° C., and then the necessary amount of ammonium sulphate is added. Double decomposition ensues, and as soon as the surface begins to froth the mother liquor is sent to the crystallizing vessels, where 95 per cent of the iron sulphate crystallizes out. The iron crystals are washed, and the wash water added to the ammonium chloride mother liquors. To obtain the crude ammonium chloride, these liquors are simply evaporated in flat pans. To obtain a refined salt, ammonium sulphide and barium chloride are added, and after filtration the liquors are concentrated in enamelled vessels as before.

Preparations of Digitalis.

CONTINENTAL physicians have recently been discussing the efficacy of preparations of digitalis, and one of them focussed the general ideas when he said that he preferred the cold infusion on account of its supposed greater diuretic activity. It is prepared by taking from 0.25 to 0.40 Gm. (4 to 6 grains) of powdered digitalis leaves and adding 300 Gm. (8 oz.) of cold water. This should be allowed to macerate for twelve hours, and should then be filtered. It may be sweetened with syrup. When it is desired to obtain a powerful diuretic action, it is preferable to administer this quantity in two or three doses. There is nothing very new about this, but it is well to print it as a reminder that preparations of digitalis containing alcohol are often inert.—*Chem. and Drugg.*

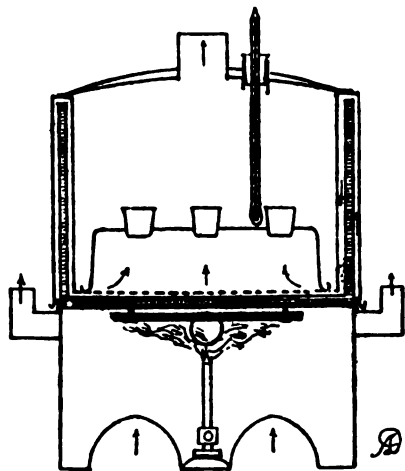
Carbolic Acid in Disinfectant Preparations.

BEFORE proceeding to describe the methods for the analysis of carbolic powders, which he himself has elaborated, Dr. Muter very rightly pointed out, at a recent meeting of the Society of Public Analysts, the want of unanimity existing amongst chemists, local authorities, and contractors in adopting terms that shall correctly indicate the nature or quality of the disinfectant powder. The form of contract commonly runs: "For carbolic acid powder containing 10 per cent of liquid carbolic acid at a fixed price per ton." What must be taken to be meant by "ten per cent carbolic acid"? Certainly not 10 per cent absolute phenol, for, as chemists well know, the liquid acid as ordinarily sold for disinfecting purposes—and this is generally used for the powder—chiefly consists of crude cresylic acid (cresol). It is, in fact, the crude coal-tar phenols, from which most, if not all, of the true carbolic acid has been removed by carefully conducted distillation, the boiling point of carbolic acid being 184° C., and of cresylic acid 203° C. Dr. Muter reasonably says, "Why should this fact not be very generally recognized by medical officer of health, contractor, and analyst alike?" There can exist no doubt of the great importance of a control analysis of such a well-established and widely used antiseptic. When, then, the report of the official analyst states that the powder contains so much per cent tar phenols or cresol, the authorities not unnaturally demand an explanation, as they distinctly contracted for "carbolic acid." The author quoted an instance—and he appears to be acquainted with many similar instances—where a firm having taken a contract to supply carbolic acid powder, the medical officer threatened to compel them to supply a powder containing 10 per cent of pure absolute phenol, as that was what he understood by the simple term "phenol." Dr. Muter submits for consideration the advisability of impressing the authorities and the manufacturers with the necessity of dropping misleading technical names, and, when contracting for a carbolic liquid or powder, to offer or regard it as containing so much per cent of uncombined tar phenols (chiefly cresol). This appears to us a wise suggestion, and decidedly the way out of the difficulty, especially as it is now generally admitted that cresylic acid, or cresol, is in no way inferior—indeed, some affirm it to be superior—to carbolic acid, or true phenol, as regards its antiseptic qualities.—*Lancet*, May 3d.

A CONSTANT AIR BATH.

An improved hot-air bath, which can be kept at a constant temperature, has been devised by Mr. H. Grimshaw. We give his own description (after *Journ. Soc. Chem. Ind.*, May 31st):

The construction of the bath will, I think, be seen at a glance from the diagram appended, which is one-eighth the real size. It consists of four parts: 1, the body; 2, the vessel forming the air envelope or casing; 3, the base—all of which are cylindrical. 4. The lid or cover. The body is made of cast iron or brass, and is merely a cylinder 11½ inches in diameter externally and 8 inches deep, closed at the bottom, and of a uniform thickness of



one-quarter inch. The object in making this so thick is to provide a mass of metal which will distribute and, to a large extent, control the heat. This part might be made of sheet copper or even stout sheet iron, but would not be so effective. Also, the body and the base might be cast in one piece, but this would add unnecessary weight.

The base is made of stout sheet iron or sheet copper, and is, in the model I have made and used, 11½ inches in diameter and 7 inches deep. It is cylindrical and closed at the top. It is provided at the bottom with semicircular apertures for the admission of air to the Bunsen lamp, and close to the top are four short chimneys of sheet iron at least 1 inch in diameter, turned upward at a right angle. The object of these is to carry away the products of combustion and deliver them at a level above that of the intake of air to the drying chamber, thus avoiding the presence of these gases in the interior of the air bath. Attached to the top of this part of the apparatus is a kind of baffle plate of one-quarter inch iron to receive the flame of the Bunsen instead of allowing it to play directly upon the top of the base cylinder, by which means radiation of heat from the bottom of the bath is lessened and the sheet metal of the base is not burned away. I need scarcely say that all the joints of this heat chamber or base should be made tight without the use of solder, which would be melted out. A rose burner is better than the ordinary Bunsen as the source of heat. In the next bath which I make I intend to make the base of a slightly greater diameter, so that in packing the air bath for transit or storage the other portions may be placed inside it to save room.

The third portion of the bath, which I will call the air case, is merely a double cylinder of sheet iron or copper, open at top and bottom, but with the space between the two cylinders closed at the top and open at the bottom, so as to slide over the body of the bath, leaving an air space of about one-quarter of an inch on each side of the body, the thick metal of which imparts its heat to the air as it travels up the outside and down the inside. The air case is of course cylindrical, the internal cylinder being 10½ inches in diameter and the outer cylinder about 1 inch wider, whilst the height of each is about 8½ inches. I propose to try the effect of adding still another enveloping cylinder externally to this part of the bath, through which the heated air from the base will circulate, which will give an economy of heat and possibly still greater regularity. A series of "notches" taken out of the bottom edge of the interior cylinder admit the hot air uniformly all round the cover of the circumference into the whole of the chamber by means of a finely perforated plate, shown by the dotted line.

The fourth part of the air bath is the cover, which is made double to prevent radiation of heat, and has a chimney 2 inches in diameter and about 2 inches or 3 inches high. The chimney may have a circular damper fixed on a swivel, or a series of perforated caps, to regulate the draught of air through the drying chamber. Through the lid there is a 1-inch aperture for a cork carrying the thermometer. Another similar aperture may be made to carry a maximum thermometer to indicate whether, between the intervals of reading, the heat of the bath has been at any time too high.

The diagram shows a stand, inside the bath, of about the right height to bring the vessel containing the sub-

stance into the most constant zone of heat. The outside of the bath may be of course japanned or colored as desired.

ANOTHER CONSTANT AIR BATH.

CONSTANT air or water baths, with so-called thermostats, are at present occupying the attention of inventive experimenters, and appear to be as fruitful a field of invention as the constant extraction apparatus. The reason is simply this, that this kind of apparatus has become generally necessary, and is desired to work so accurately that it may be trusted to do its work without watching. The time is not far distant when every laboratory will have to be provided with thermostats, and it is well to look around in time to select the best one.

One form of this apparatus which has recently been highly recommended is here illustrated. Fig. 1 represents the thermostat of D'Arsonval, with the improvement suggested by B. Pensky, of Berlin (*Zeitsch. f. Instrum.*, 1890, 28). The air bath is a double-walled, cylindrical vessel with conical bottom, the inner chamber being continued, in form of a tube, to the end of the cone, and the opening being closed by a cap, N. Its upper edge is somewhat slanting, for the purpose of making the point o higher than any other part, for it is necessary to fill the apparatus with freshly boiled water completely, without any bubble of air remaining in it. The tube r is connected with the gas supply. Its orifice is opposite a rubber membrane, M, which is under more or less outward pressure from the water enclosed in the apparatus, the pressure being, of course, somewhat greater

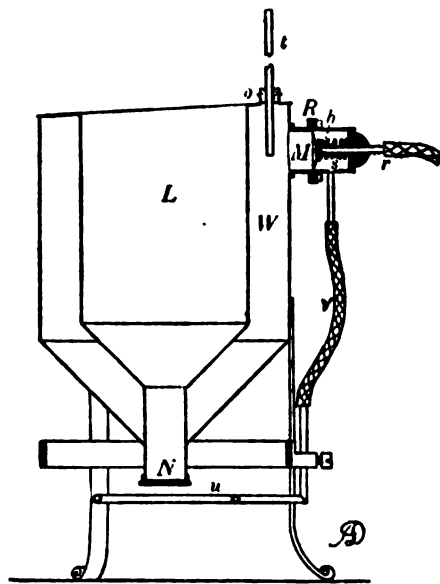


Fig. 1.

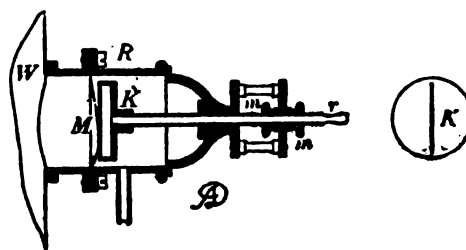


Fig. 2.

near its lower surface than near the upper, due to the difference in the height of the column of water. At o there is a stopper bearing a long glass tube, in which the water can rise when it becomes unduly expanded by heat. When it does rise, the pressure on the rubber membrane causes the latter to more or less occlude the orifice of the gas tube, and the consequence is a diminished gas supply through the tube v to the burner u, until the water in the tube has sunk owing to a fall of temperature. When the apparatus is first set in action it requires some time and adjustment of a slide at s to get the orifice of the gas tube at the proper distance from the membrane, and in the original apparatus (as here illustrated) this adjustment often took place by jerks, causing the burner to become entirely extinguished. Pensky has, however, introduced an ingenious improvement, shown in Fig. 2. The end of the gas tube is shaped as a round flat having a perpendicular, fine slit for the exit of the gas. When the tube has once been properly adjusted in its bearings, and there is an increase of temperature beyond that required, the lower bulging portion of the membrane M (see cut) begins to close the slit from below upward by mere contact. There is no friction of any kind. A simple reduction of temperature will again make the membrane recede. Of course, the membrane will have to be occasionally renewed. The air bath is provided with a suitable cover, which is omitted in the

lustration. If a current of air is to be passed through the apparatus, the cap N is more or less turned on one side.

This apparatus is made by Sommer & Runge, of Berlin, and allows the temperature to be kept constant within 0.1°C.

Otto of Rose.*

THE most important centre of the production of otto of rose is in the region of the Balkan Mountains, and includes about one hundred and fifty villages situated in the two valleys of Toundja and Strema, affluents of the river Maritza. These two valleys run from west to east, and lie between the great Balkan chain on the north and the Sredna-Gora Mountains on the south, the extreme point where rose culture is carried on being Koprivchitza on the west and Tvarditza on the east. The best otto is obtained on the southern slope of the Balkans. Here the climate is temperate, but the variations in temperature are sudden and frequent. The ground is sandy and porous, as a rule; where this is not the case and water accumulates, roses are killed by the frost, or by fungi which attack the roots. Although the rose cultivation extends over a large tract of country, it is nowhere conducted on a large scale by any one individual, but is divided into a large number of small plots belonging to small proprietors. The dealers live in the towns, and, although they sometimes buy the flowers and distil the oil, they rarely cultivate the roses, and then only to a small extent.

The roses are grown in long borders or plots, 100 or 200 meters long, the plants attaining the height of a man. Between the plots a space of 1½ to 2 meters is left, so as to allow of a cart passing along between them.

Two roses are usually cultivated, a red and a white one, specimens of which, received from M. Christoff and gathered in the Kezanlik plantations, have been identified by Dr. Blondel. The red one proves to be a branching form of *Rosa damascena*, and the white one *Rosa alba*. One other rose, known as the Constantinople rose, is sometimes met with near Kezanlik. It grows more quickly, but is less hardy, and cannot be made a special cultivation. It has larger and more coriaceous leaflets, and the flower is smaller than that of *R. damascena*, and of a dark, nearly violet color, like *R. Gallica*; it probably belongs to the same group as the latter, but has not been identified.

The *Rosa alba* is employed to form a dividing line between the different plantations, and is also grown at the end of each plot, so as to present only roses of less value to the peasant, who would otherwise steal the more valuable red rose. It is not used, as a rule, for distillation. Dishonest cultivators, however, take advantage of the fact that when distilled it yields a product rich in steareopten (although of poor fragrance) to mix it with the red rose, and thus obtain an otto which will bear dilution with Turkish oil of geranium (oil of *Andropogon Schœnanthus* L.).

The plantations are renewed, when required, in October or November, by making trenches about one-half foot deep and 1 wide, and laying side by side in them suckers with a portion of the underground stem attached.

About four or five are placed in a row, the leaves all being covered with a layer of earth and then with a thin layer of manure. The young shoots make their appearance in five or six months.

In April and June the furrows containing the young plants are weeded. In November the remainder of the earth is returned to the trenches, and the trenches are ultimately formed into ridges to better protect the roots of the plants.

In May of the second year the rose trees are about 2 feet high and yield sufficient flowers to pay the expense of their cultivation up to that date. The next year they are in full bearing; and the maximum product is obtained when they are five years old, although the plants will live more than twenty years. At ten years of age they are, however, usually cut level with the ground, new branches, and even flowers, appearing the next year. The flowers commence to expand between May 20th and 28th, and they are collected daily till June 15th and 20th. The collection commences every day at dawn, for an opening flower bud left till next day will then have lost its fragrance and its color. The flowers are collected by women, and, although the small proprietors usually collect their own, the larger growers pay about 2 centimes per kilo for collecting the flowers. The blossoms are placed in a basket carried on the left arm or in the apron. The fingers become gradually hardened to the spines, so that the pricking ceases to be felt; but the fingers become covered with a blackish, resinous substance which has a terebinthinous odor, and which at the end of the day is scraped off, rolled into little balls, and kept for smoking in cigarettes, inserted in the tobacco, to which it is said to give a delicious odor. The contents of the basket are weighed in the field, paid for, and emptied into sacks, which are carried at once to the distillery. If

the white roses are present in too large proportion, they are paid for separately at a lower price.

The stills are usually placed in sheds near the river, for the convenience of obtaining a good supply of water, and in some cases are let by the proprietors at the rate of 4 francs per still. The stills are of copper, and are made to contain 75 liters of water and 10 kilos of flowers.

The latter are introduced by means of an osier basket, and the stills are heated with long logs of wood lighted at one end, placed under the still. After a time, if steam comes out of the refrigerating tube, the fire is moderated, and when 10 kilos (two flasks) of rose water have distilled over, the fire is removed by withdrawing the burning logs. The still, when cool, is opened, the contents strained through the osier basket, and the water remaining in the stills saved for the next distillation. If the operation is continued until 15 kilos of rose water are obtained, the otto is of inferior quality and contains more steareopten.

The rose water is then submitted to distillation a second time, 40 liters being distilled at a time, and only 5 liters collected. The vessels in which it is received have the shape of a long-necked flask, and the water is at first milky, like an emulsion, the oil floating after a time in the neck of the flask. It is removed by inserting a conical tin funnel about 2 Cm. long, furnished with a slender handle, and having a capillary orifice. It is dipped below the surface of the otto, and when a drop of oil, on raising the funnel, appears at the orifice, it is emptied quickly into a special flask.

About 3,000 kilos of flowers are calculated to yield a kilo of otto, and this quantity of flowers is the usual yield per hectare, so that it may be considered that a hectare of roses yields a kilo of otto. The adulteration of the otto takes place chiefly by the addition of oil of rose geranium (*Andropogon Schœnanthus*), whereby the congealing point is lowered from 15° or 16° C. to 14°, 13°, or 12°, and even lower. The purchaser of otto generally brings with him a basin and thermometer, and, having obtained the desired temperature with the thermometer, inserts a flask containing 15 Gm. of the essence to be tested. In about three minutes crystalline needles appear, and in ten minutes the otto is solid enough for the uncorked flask to be reversed without spilling a drop. The price varies according to the degree of congealing point, that below 12° C. being openly sold at a special rate. The average production of otto of rose in Bulgaria is about 3,000 kilos in good years, and 1,500 kilos in bad ones.

The peasants are paid, according to the season, at the rate of 0.22 to 0.23 franc per gramme for otto of standard purity. The flattened circular metal bottles in which it is exported contain 400 Gm., 1 kilo, or 2½ kilos, and the price of the pure essence is 800 to 900 francs per kilo, according to the season. The bottles are generally enveloped in felt. When the essence is freshly distilled it has a slight empyreumatic odor, possibly due to the fact that the water in the stills at the end of the day, having served for several distillations, has dissolved vegetable salts and boils at a temperature distinctly above the boiling point of pure distilled water. Otto of rose is also said to be produced in notable quantities in Asia Minor, at Broussa, Bourgas, and elsewhere, by immigrants from Roumelia.

In Provence the cultivation of the roses is at the present time a flourishing industry, and the otto prepared in that district is considered superior to the Bulgarian product. It is obtained from *Rosa centifolia* (a specimen of the plant used from Grasse having been determined by Dr. Blondel). This rose flowers there in April and May. Rose water is sometimes distilled from the yellowish tea rose known as the Safrano, which flowers in autumn and winter; but the water is very inferior, and the otto obtained from it is still more so, and unfit to mix with that of *R. centifolia*.

The cultivation of *Rosa centifolia* is carried on chiefly around Grasse, Cannes, Nice, and Valois by peasant proprietors, who sell the flowers to the distillers in the towns. The roses are grown in little hedges separated by paths 1 to 1½ meters wide. The flowers are gathered at the end of April, or about twenty days earlier than in Bulgaria, and the collection lasts twenty to thirty days. The collection commences at dawn, and the collectors, both men and women, are paid at the rate of 0.45 franc per kilo-gramme, the price in bad seasons rising even to 1½ francs. The chief use of the roses is for making rose pomade, only a small quantity, comparatively speaking, being distilled for the otto. The flowers are distilled in large stills, such as are generally used for spirit, some holding as much as 150 kilos of flowers. Often one refrigerator receives the condensing pipes of several stills.

Usually 60 kilos of flowers and 300 liters of water are placed in the still at one time, and 100 liters are distilled over, the first 25 being the richest in oil and known as eau double de rose; the next 30 are of medium and the remaining 45 of inferior quality. The oil which floats is collected by means of a florentine receiver. The yield of otto is small, 10,000 kilos of flowers giving only a kilo of otto, and the price is about 1,000 francs per liter; the average price of the rose water is 2.60 francs per liter.

* Abstract from "Les Produits odorants des Rosiers," Dr. R. Blondel, Paris, 1889. After Pharm. Journ.

In Germany roses have been distilled for about five years in the neighborhood of Leipzig, about 6 hectares being at present under cultivation. The species employed is *Rosa centifolia*, and the amount produced in 1887 was 3,000 liters of rose water and 2 kilos of otto. The latter congeals at 20° C., and contains 32½ to 34 per cent of stearopten, which is in excess of that in Bulgarian otto. Indeed, the proportion of stearopten present in otto of rose is always greater in cold countries.

Formerly otto of rose used to be adulterated by mixing it direct with oil of gingergrass, but now the flowers are sprinkled with the oil when placed in the retort. The odors, under these circumstances, amalgamate better, and during the distillation the proportion of waxy (cireuse) matter that passes over is larger, so that otto thus obtained may solidify at 14° even when containing 25 per cent of oil of gingergrass. In this case, however, the otto appears muddy, and does not present the sparkling crystals characteristic of pure otto. The odor also is easily detected by an expert. Bromine turns pure otto of rose of a green color, but is itself decolorized by oil of gingergrass, and if a few drops of liquor potassæ are subsequently added an apple-green precipitate, in viscous clots, is formed in a colorless liquid, and the odor of roses is not altered; but if adulterated with gingergrass oil a yellow, milky precipitate is obtained in a reddish liquid, and a disagreeable odor is given off. This test, however, is qualitative rather than quantitative.

The presence of spermaceti or paraffin in otto is detected in Bulgaria by rubbing the small test bottle of otto, containing about 15 Gm., between the hands, when the essence rapidly liquefies, since a temperature of 18° C. suffices, whereas paraffin does not melt till 32° to 50°, and spermaceti at 46° C., and these remain undissolved at the bottom of the bottle.

Experiments made by Dr. Blondel show that pure otto of rose has some physiological effect. In the dose of 5 or even of 2 drops it produced cramp of the stomach in the absence of food. Taken after a meal it seemed to stimulate the digestive functions at first, but doses of 10 or 12 drops appeared to have an opposite action and caused marked flatulence. The only general effect noticed was a marked tendency to sleep. A guinea-pig, into which a cubic centimeter of otto was subcutaneously injected, died in four days after a state of profound torpor lasting forty eight hours. The only effect noticed in a post-mortem examination was a slight congestion of the meninges. In some persons the odor of the rose produces headache, and in rare cases severe symptoms, which are probably due to idiosyncrasy. The oil of *Andropogon Schœnanthus*, or Turkish oil of geranium, used to adulterate oil of roses, produces similar symptoms, but in a higher degree. With regard to the portion of the flower in which the otto is formed, observations made under the microscope by Dr. Blondel indicate that it is secreted by the epidermal cells. If a section through a petal is immersed in a one-half-per-cent solution of osmic acid for about twenty seconds, and then washed in distilled water and mounted in glycerin, the upper and lower epidermis are seen to be the parts distinctly blackened.

How Rubber Bulbs are Made.

It is commonly supposed by the uninitiated that the "bead," or raised line that encircles a bulb, shows the joining of the pieces of which it is made.

The fact, however, is that the pieces or original parts of the bulb are invariably joined at right angles to the bead line. Long bulbs, such as syringes and atomizers, are made of two pieces; round bulbs, as pumps and balls, are made of three pieces. New and unique styles that call for variation from the established modes are daily encountered.

A competent pattern maker, however, will find little difficulty, as a general thing, in so joining the parts as to secure the best results, both in vulcanizing, where the even swelling of the article must be considered, and in wear and tear, where the seams must run so as to be protected as much as possible by the general contour of the bulb.

After the pattern maker has decided by measurement and experiment upon the shape and size of the parts which go to form the bulb, zinc or galvanized iron patterns are made and given into the hands of the cutters. Mixed sheets of the required thickness being spread and afterward cut into convenient sides or squares, the bulb making begins. Each piece cut must have distinctly skived edges. Considerable care is necessary in this, as the strength of the seam depends upon the smooth fitting of the edges.

The three parts for hollow balls may, however, be cut with a die. The pieces, when cut, are arranged in large books with leaves of smooth cloth. If the bulb has a neck, small pieces of iron are first prepared by being cemented and wound with strips of rubber as a nucleus for the neck. The two or three parts of the bulb are then brushed with cement the whole length of the skived edge, after which they are thoroughly heated.

When thoroughly warmed and softened, the bulb maker, taking a prepared peg, places the neck of one

piece on the opposite side, then presses them firmly together, and, rolling the whole tube-shaped piece between thumb and forefinger, has finished the neck of the bulb. The next process is that of knitting the edges which form the seam. Holding the finished neck toward him in his left hand, with the thumb and forefinger of the right he pinches the edges firmly together for nearly the whole distance round. The shape is now not unlike that of a "long clam." Into the side aperture, which is left open, is poured a little water or liquid ammonia. The opening is then made still smaller, and, as a final touch, the maker puts his lips to the orifice, and, puffing out his cheeks till they look like miniature balloons, blows full and hard into the inside of the bulb. The softened rubber, under this sudden pressure, expands, the flattened shape is lost in a fuller and more rounded outline, while the operator, with a quick nip of the teeth, closes the opening, the imprisoned air and water holding the sides apart in symmetrical corpulency.

There are those who can never learn the knack of blowing up a bulb with the mouth, but are obliged to use a bulb to inject the air.

After the makers have done with the now partly made bulb it is passed to the trimmers, who, armed with scissors with curved blades, carefully circle the seams, cutting away all unevenness, till the whole exterior is smooth and ready for the mould. In front of the trimmers are a number of shallow pans partly filled with chalk. Into these the bulbs are laid. A small dumbwaiter takes them down to the mould room and returns the empty pans. The bulbs on leaving the chalk pans are deposited in a small cylindrical box, which, turning a few times, powders them so effectually that the rubber cannot adhere to the inside of the mould. An experienced mould worker now taking one-half of a mould in his left hand, with his right gently forces the bulb into it, capping it with the second half. If the pattern maker has done his part faithfully, each will just fit its mould; if not, they will come out of the vulcanizer wrinkled, showing that it was too large; or if glazed and imperfect, that it was too small.

A flat iron ring or clamp holds the two sections of the mould together when in the vulcanizer. This is tightened by iron wedges, which are driven between the mould ends and the clamp. The moulds after being keyed are piled on cars that run upon small tracks into the vulcanizers, and are cured by steam heat. When the curing process is completed the vulcanizers are opened, and the cars, by a short extension of the track, are run under a simple shower bath, which quickly cools them. They are then unkeyed, the moulds twisted open, and the bulbs taken out. If the work be well done, the swelling of the liquid within its rubber prison has exerted so intense a force that every line and letter within the mould is reproduced upon the outside of the bulb, while the sulphur combining with the heat has sealed the copies with its magic spell.

The iron peg in the neck is next loosened by means of a blunt awl and slipped out, leaving the bulb perfect in shape. In the mould room are large car-like boxes, into which the bulbs are thrown. A box being full, it is trundled away to the cylinder room, where it undergoes a thorough scouring and polishing in huge slowly revolving cylinders.

When taken out of the cylinders the dirty yellow color which the bulb bore on leaving the mould has wholly disappeared. It now looks smooth, white, and finished. The neck being cut off the required length by a small adjustable cutter (devised expressly for the purpose), the bulb is ready for the market, or for the various fittings which accompany it as adjuncts to the syringe, atomizer, or other bulb. Where a smooth, clear-cut hole is needed in any part of the bulb except the neck, it is cut by a swiftly revolving punch. The neck hole is left by the iron peg, as already described.

A good illustration of the power of the imprisoned steam within the bulb may be obtained by knocking a clamp off a mould before it has been treated to a shower bath. The two hemispheres of iron will fly apart as if by magic, the bulb swells to treble its normal size and explodes with a loud report. The mould workers are sometimes badly burned by hot water which bursting bulbs scatter in all directions.

A well-made bulb, one that has just the right smoothness of outline, that is not scarred by imperfections in the mould, and that has the whiteness of a healthy cure, is an object that always wins the respectful admiration of rubber men. Toys, balls, and hollow goods generally are all made in the same manner as bulbs.—*Rubber World*.

Fluoride of Sodium.—This compound has been experimentally examined by Tappeiner with reference to its physiological action, particularly compared with that of sodic chloride and bromide. He found that it produced effects similar to those of the latter salts, particularly as regards the weariness, inclination to sleep, and the retarding of speech and mental processes. On the other hand, he observed that a 0.1 to 5-per-cent solution has a restraining influence upon the development of bacteria and cocci.

—*Chem. and Drugg.*

Note on Hops, its Bitter Principle, and its Narcotic Properties.

AN interesting discussion took place recently at a meeting of the Society of Public Analysts (London), on the bitter of hops as distinguished from quassia bitter, and on certain hop substitutes. An elaborate paper on the subject was presented by Mathew A. Adams, which formed the basis for the discussion. Those portions of the paper which have a more direct interest for our readers are here reproduced, after the *Analyst* (July, 1890).

The proximate nature of the hop bitter is ascribed to several resins varying in intensity of bitter, but I hardly think its true nature has yet been positively and definitely made out. I suspect that a part, if not the whole, of this bitter is of the nature of a glucoside; at all events this view fits in very well with the facts. For instance, fermentation removes a large part of the bitter, and on boiling a 2½-per-cent decoction of hop with 2½ per cent of sulphuric acid under a reflux condenser for two or three hours, every trace of bitter is entirely removed. But quassia and its allies are not at all affected by this treatment. This is the keynote of the distinction between the fixed and fugitive bitters—the latter being more or less of the nature of the glucosides, on this account disappearing by conversion into glucose in the acidified decoction, and in the mouth by digestion through the agency of the ferment proper to the saliva—and so we can now understand how it is that the palate, when dealing with a fugitive bitter, clears up so quickly, while, on the other hand, a fixed bitter, being unsusceptible of fermentative change, maintains its bitter effect so long.

As regards the argument that the fugitive character of the taste of hop bitter is due to its glucoside nature, allow me to draw your attention to the fact that salicin, a very bitter substance, but also a well-known glucoside, has this same fugitive characteristic in respect of taste, for when a saturated solution is placed on the tongue all bitterness soon vanishes.

The hop bitter, however, though it is of the nature of a glucoside, is by no means easy of conversion, so that prolonged boiling with sulphuric acid is necessary; and fearing that this somewhat severe treatment might possibly, to a certain extent, attack some of the fixed bitters, it seems as well to take advantage of the selective power of the basic acetate of lead to assist and hasten the removal of the bitter. [The author now describes his method of separation, etc.]

Upon what authority does the statement rest that hops have a *soporific* effect? I have looked through all the books on *materia medica* that are at this moment accessible to me, and I can find very little justification for the imputation that the hop is *soporific* at all; the fact is, from a therapeutical point of view, the hop occupies a very humble place, so much so that by some modern writers, as Ringer, for instance, it is not even mentioned. This is what Garrod says: "Hops are tonic and stomachic and slightly narcotic; in the form of bitter beer, taken with meals, they form a useful aid to digestion in some cases of atonic dyspepsia. The volatile oil is probably the narcotic principle, and in the form of a pillow hops have been found anodyne and narcotic."

And Neligan says: "Much difference of opinion exists as to the therapeutical properties of hops; they are generally stated to be narcotic, but from the experiments made with them on animals by Majendie and others it would appear that this effect is not manifest when they are given internally, no matter how large the dose."

And Pereira says: "The odorous emanations (vapor of the volatile oil) of hops possess narcotic properties; hence a pillow of these cones promotes sleep, as I have several times witnessed." Moreover, we are told that stupor has occasionally been induced in persons who have remained for a considerable time in hop warehouses. The lupulinic grains are aromatic and tonic; they appear also to possess soothing, tranquillizing, and, in a slight degree, sedative and soporific properties. But the existence of any narcotic quality has been strongly denied by Dr. Bigsby, Majendie, and others. "I have tried it at different times," says Majendie, "both the lupulin (lupulinic grains) in substance and its different preparations, on animals, but I have never observed that it is a narcotic, although this property is one which is most strikingly displayed in experiments on animals."

As regards the reputation of the *hop pillow*, which has been handed down from book to book, it is very doubtful if there be much in it; for, although I live in the midst of the chief hop-growing districts, I never knew of its actually being put in practice. I quite believe that it is an old legend that gained more credence than it deserved, owing to the anecdote that King George III., being a sufferer from headache, derived comfort and got sleep by the use of a hop pillow that a loyal subject of Kent presented to him. Be this as it may, so far as medical experience goes there is really nothing to countenance the idea that the hop, except in its volatile constituents, contains anything soporific, and in point of fact I do not believe the hop contributes to the finished beer, so far as the consumer is concerned, anything beyond a delicious aroma and an agreeable, salutary bitter.

Turpentine.

To obtain turpentine the tree is "boxed," or incised about a foot above ground to the extent of 7 inches deep, 3 inches wide, and 13 inches across face. The best season for boxing is from November 15th to March 1st, as the sap does not run during this time. The next step is that of "chipping" the tree with an instrument known as the "hack," which consists of a curved blade made of best steel, 2 inches wide and 2½ inches long, fixed into a handle from 1½ to 2 feet long, weighted at the opposite end, the whole weighing about 20 pounds.

The turpentine farm is divided into "crops" of 10,500 boxes, each worked by one man, who is required to go over his crop once a week and chip off one-half inch of sap wood and bark so as to expose fresh surfaces, for at the end of that time the turpentine almost ceases to exude. Trees are "chipped" only in the summer season, from March 15th to October 1st, as the turpentine flows only during warm weather.

Once every four weeks the crop is to be gone over by a second man, whose business it is to transfer the turpentine collected in the boxes to barrels. This "dipping" is done with a flat, heart-shaped steel attached to a four-foot handle.

In September the turpentine adhering to the face of the trees, and which has not run into the boxes, is removed. This product is distinguished as "Opaque," and amounts to about 25,000 pounds to each crop yearly. The collected turpentine is transferred to stills made of copper one-sixteenth to one-eighth inch thick, and holding from 10 to 16 barrels of crude.

In Willcox County the still is bricked in over a large furnace which is level with the ground. To the cap (or neck) of the still is attached a condensing worm 100 feet in length, making six curls in a large tank of cold water, at the bottom of which is an exit for the distillate. The barrels of crude are taken, by means of skids, to the second story, and when the still cap is removed the head fastenings of a number of barrels are loosened and the contents emptied into the still. To prevent unnecessary waste, these barrels are then inverted over a trough to drain. If the still contains "virgin turpentine" (or that collected from first year's chipping), less heat is required to complete the operation; but when "yearling turpentine" (or that collected from second, third, and fourth years' chipping) is used, the heat must be increased. This distinction is due to the latter being more dense and containing more resin than oil in proportion; therefore the yield of oil is not so great. During distillation, water, in quantities of 8 to 16 gallons to each barrel of crude, is gradually added through a small funnel arranged in the cap. This prevents the turpentine from scorching, besides clarifies the resin and improves its quality. When the turpentine is exhausted of oil, the cap is removed and the contents of the still are agitated for a while; at length the gate at the bottom is opened, and the mixture of resin and impurities, such as small chips, bark, etc., flows out upon sieves arranged in tiers over a large trough, from which the melted resin is transferred to barrels made of rough material, for when the resin once becomes solid it requires but little stave support. The chips, etc., are removed from the sieves and burned.

The following is a brief summary of facts which may be of interest:

- Three hundred boxes yield 1 barrel crude.
- Five barrels crude yield 1 barrel oil (spirits):
- Five barrels crude yield 3 barrels resin.

Resin from first year's yield is classed in commerce as W. W. (water white) and W. G. (window glass). Resin from second year's yield is classed as N. M. K., etc.

Oil (spirit) barrels are made to hold 50 gallons. The oil varies in price from 30 to 50 cents per gallon. Resin barrels usually hold about 280 pounds. It varies in price from \$1 to \$3 per barrel.—E. L. MURRAY, Ph.G. (Abstract of Inaugural Essay) in *Am. J. Pharm.*, 1890, 393.

Purification of Oil of Turpentine for Microscopical Purposes.

As it is difficult to obtain nice, clear oil of turpentine for microscopical purposes, I want to give other workers the benefit of my experience in rectifying the ordinary fluid. I proceed as follows:

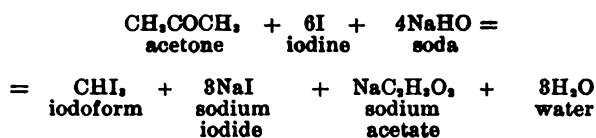
Take 1 pint of common turpentine and mix in a quart bottle with 4 fluidounces of 98-per-cent alcohol. Agitate well and let stand until the two fluids separate. Decant the turpentine (which will form the lower layer) from the alcohol, and mix it with 1 pint of clear water. Agitate thoroughly and let stand until these two fluids separate, then from the water decant the turpentine (which this time will form the upper layer), and finally mix with the turpentine about 1 ounce of powdered starch, and filter through paper.

By pursuing the foregoing plan, any one may secure a pure, limpid, and brilliant turpentine. The alcohol used in purifying it need not be wasted, as it will do to burn, to clean slides, or for other purposes.

I usually make a large quantity and recover the alcohol by distillation.—CHAS. C. PARIS in *The Microscope*.

On the Formation of Iodoform from Acetone, and the Analytical Determination of the Latter.

THE production of iodoform from acetone is based upon the following reaction, first discovered by Lieben:



A recent study of this process, by G. Arachenesque, has shown that all the acetone can be converted into iodoform, but only when there is more than the theoretical quantity of iodine present.

If acetone is to be determined quantitatively, for instance in methylic or wood alcohol, it is advisable to have not more than 1 per cent of acetone present, if trustworthy results are expected. When its percentage has been found by preliminary trials to exceed this, the original liquid is suitably diluted by means of water until a liquid of the proper degree of dilution is obtained. Of this, 5 C.c. (corresponding to a certain known volume of the original liquid) are poured into a globe funnel with stopcock, and next are added 10 C.c. of solution of soda of double volumetric strength (or 80 Gm. in 1 liter) and 5 C.c. of doubly-normal volumetric solution of iodine. After shaking, another like volume of soda and iodine is added, and this is continued until after renewed shaking no more iodoform is seen to render the supernatant liquid turbid. The stopcock of the funnel (which should be some distance from the neck) is then opened, and the iodoform which had settled down is run out into a burette having at its bottom a pellet of asbestos, which allows only the liquid to pass. After the pellet is washed the iodoform is dissolved out by ether, the latter evaporated, and the iodoform weighed.—*Compt. Rend.* and *Chem. Centralbl.*

The Occurrence and Extraction of Ozokerite in Galicia.

THE most important deposit of ozokerite is near Borislav, where it occurs in a marl containing salt. The wax is found in irregular lumps, sometimes of great size, or in layers which frequently die out completely. The neighboring rock consists of clay-slate marl and sandstone.

The centre of the basin is richest in wax; in some cases masses of such extent have been tapped that the miners have hardly had time to escape before the workings were filled with the plastic mineral. Such a deposit was recently found in the deepest shaft at Borislav, at a depth of 208 meters (227 yards). In general, however, the yield of wax varies at from 2 to 8 per cent of the mineral extracted. Ozokerite was first found in this district in 1854 by Doms, who was in search of petroleum, with which much of the ground is saturated. At first it was regarded as an unwelcome companion to petroleum, as it frequently caused the timbering of the shafts to collapse.

It was not until about twenty years later that this substance began to attain commercial importance, a method having then been discovered of producing from it a substance resembling beeswax, and named ceresin.

In 1865 ozokerite, which had previously been regarded as a crown mineral, was declared free, and the consequence was that a number of shafts were sunk in the district and much speculation ensued.

The land being parcelled out in small plots, the shafts were sunk in the immediate neighborhood of each other, and much waste and danger ensued.

In 1886 the present law was passed, according to which the right of mining ozokerite may be separate from the ownership of the land. The extraction is now carried out under official supervision.

In nearly every case the mineral is raised through vertical shafts or pits, over which a wooden roof is erected. The section of the shaft in the first instance is 3 to 4 square meters (32 sq. ft. to 43 sq. ft.), but when the ozokerite formation is reached an inner shaft, 1 meter square (10.76 sq. ft.), is formed of timber, and the space between this and the timbering of the larger shaft is filled with a rich clay.

This construction is adopted to exclude the surface water, which is kept down by hand pumps during sinking.

From the bottom of the shafts levels are driven into the ozokerite ground, the richer portions being raised and the refuse used to fill up the old workings.

The softer parts of the marl are dislodged by means of pick or wedge; but where the rock is hard, and the permission of the mining authorities can be obtained, dynamite is used.

The mineral is raised by hand in skips or tubs holding 40 to 50 kilos (88 to 110 pounds). Hand ventilators are used for the purpose of ventilation, but explosions of gas are not uncommon, especially after Sundays and holidays.

Fatal accidents are, however, rare. Safety lamps are

used in all the mines. The timbering of the shafts requires constant renewal and repairs; in some cases it is almost impossible to keep the shafts perpendicular.

The water is usually raised in tubs, and much difficulty is experienced in getting rid of it after it reaches the surface, on account of the numerous shafts and the broken nature of the ground.

The mineral when it leaves the tube is sorted by hand. The waste rock is picked out and tipped to spoil, lumps of ozokerite are specially selected, and the remainder of the rock, containing fragments of wax, is tipped into tanks full of water. On being well stirred the most of the wax rises to the surface and is skimmed off. The residue still contains from 2 to 3 per cent of wax.

The quantity of waste mineral being considerable, and the distance between the shafts small, a special railway has been built to remove the residues from the immediate neighborhood of the mines.

Only one attempt has been made to mill on a large scale for ozokerite. In this case a circular shaft 2 meters (6 ft. 7 in.) in diameter, and lined with iron tubing, was sunk outside the ozokerite zone, and the deposit was reached by galleries. Trucks holding 500 kilos (1,102 pounds) were used, and both ventilation and pumping were done by steam power.

The operations on a large scale do not, however, seem to have been successful, the French company which carried them out having now ceased working.

The production of ozokerite in the Borislav district amounted in 1887 to 96 per cent of the total output in Galicia, and was valued at £152,900.—J. SHOTSKY, in *Allg. Oest. Chem. und Tech. Zeit.*; after *J. Soc. Chem. Ind.*

The Purity of Antifebrin.

It is strange that warnings should only just now be heard of the dangers of antifebrin, or acetanilide, after it has been for so long a time in commerce.

The number of more or less pronounced acute poisoning cases with the preparation has given rise to a more intimate investigation of its properties and action, both from a physiological and therapeutical point of view.

In this way it has been ascertained that nearly all the acetanilides of commerce are impure, not having the true melting point, and it is believed that all the untoward symptoms are to be ascribed to foreign compounds, specially to toluidines present as impurities.

One case has been reported where a student took no less than an ounce of antifebrin, "chemically pure," with impunity, which would not have been the case if the specimen had been impure.—BERLIN CORRESPONDENT of *Chem. and Drugg.*

Behavior of Paraffin towards Certain Solvents.

PAWLEWSKI draws attention to certain peculiar features which paraffin exhibits when dissolved in certain volatile menstrua. The experiments of the author were made with the white paraffin obtained from ozokerite, also called white ceresin. This had a specific gravity at 20° C. of 0.917. Its melting point was at 64°–65° C., and its congealing point at 61°–63° C. In its solutions, presently to be described, this paraffin showed every evidence of belonging to the so-called colloid substances.

A 1-per-cent solution of paraffin in benzol, obtained at a temperature of 20° C., when cooled to 5°–7° C. congeals to a homogeneous jelly which cannot be poured from the containing vessel. A similar solution, of 2.2 per cent, yields so firm a jelly that it is able to bear a weight of several grammes without losing coherence. Solutions of paraffin in xylol (para) behave in the same manner.

A solution of 3.53 Gm. of paraffin in 100 Gm. of chloroform, prepared at 26°–27° C., when cooled to 18° C. furnishes a jelly so dense that it can bear a weight of 800 Gm. without being ruptured. The paraffin which has separated in this kind of jelly is very much swelled up, similar to gelatinized starch. Solutions of paraffin in carbon disulphide and in oil of turpentine show the same behavior.

Most characteristic is the action of ether upon paraffin. On pouring ether upon thin shavings of paraffin, prepared with a razor, and thoroughly mixings, the shavings will disintegrate and form a fine powder, part of the paraffin passing into solution. After the solution has stood from 12 to 20 hours, and the temperature has slightly fallen (2° C. is sufficient), the dissolved paraffin separates in strongly swelled flakes, very similar to a jelly.

When paraffin separates from the before-mentioned solvents, not a sign of crystallization can be observed either with the naked eye or under the microscope. It is otherwise when acetic acid is used as solvent. Solution of paraffin in this liquid, whether saturated or not, deposits the paraffin, on cooling, in form of small laminae, which separate perfectly from the solvent. This is even the case when a boiling solution is cooled off. Towards acetic acid, therefore, paraffin acts like a crystalloid. The colloidal nature of paraffin explains its presence as "vaseline" in crude petroleum.—After *Berichte*, 1890, 327.

Micro-Chemical Distinction of Alkaloids and Proteic Matter.

In the study of the localization of alkaloids in plants, which is a very important one from the standpoint of vegetable physiology, there sometimes occurs a great difficulty resulting from the fact that certain alkaloids are not possessed of special characteristic reactions.

Although we can have recourse to general reagents only, it must not be forgotten that, without mentioning certain amines and glucosides that are precipitated by iodine, the general reagents of the alkaloids also precipitate most of the proteic matters.

Here is a point that the best chemical works neglect to bring into prominence, and one to which Mr. L. Erreva, who has given much study to the localization of alkaloids in plants, has paid particular attention. In order to supply the existing want, Mr. Erreva proposes to have recourse to solvents of which the use is based upon the fact that the acid salts of the alkaloids are soluble in alcohol, while the proteic matters are not; in fact, among the latter there is scarcely any save gluten fibrin (extracted by Ritthausen from the gluten of cereals) that seems to form an exception. This is reputed to dissolve in absolute alcohol, but in very minute quantity.

Mr. Erreva's experiments have shown him that alcohol acidulated with tartaric acid (recommended by Stas for the micro-chemical extraction of alkaloids) very well realizes the double desideratum, that of dissolving the alkaloids and precipitating proteic matter so as to differentiate them micro-chemically. For the preparation of the reagent Mr. Erreva recommends the following proportions:

Crystallized Tartaric Acid..... 1 Gm.
Alcohol.....20 Cc.

Absolute alcohol might be used. In certain cases it precipitates the peptones more completely than the tartaric acid solution does, but it afterward gives less marked precipitates, especially with iodine, and it does not dissolve the alkaloids so well.

Alcohol acidulated with hydrochloric acid (recommended by Gautier) gives excellent results in the dissolving of alkaloids, but it is not so well adapted for the precipitation of proteic matters. In fact, as Hoppe-Seyler remarks, the peptones are not precipitated from their aqueous solutions in the presence of free hydrochloric acid.

The alcoholic solution of tartaric acid therefore merits the preference. As for the manner of operating, that consists in soaking in this liquid, for twenty-four hours, sections thick enough to contain one layer of entire cells. The sections are removed from time to time and placed in distilled water and treated with the general reagents—iodide of potassium, double iodide of mercury and potassium, phosphomolybdic acid, etc. If it is a question of alkaloids, these will have been removed by the alcohol, and the general reactions will not have occurred; but if, on the contrary, it is a question of proteins, these will have remained in the cells, and the reactions will have been obtained as before.—*Revue Scientifique and Scient. Am. Suppl.*

Distribution of Solanine and its Micro-chemical Reactions.

M. E. WOTCZAL has published an elaborate paper on this subject in Russian. He finds only three trustworthy tests for the presence of solanine, viz.:

1. Mandelin's vanadin-sulphuric acid, i.e., 1 part of ammonium-metavanadate in 1,000 parts of trihydrate of sulphuric acid ($H_2SO_4 + 2H_2O$). The test is one of extraordinary delicacy; if the preparation contains solanine, it goes through the following series of colors: yellow, orange-red, purple-red, brown, pure red, violet, blue-green, and then disappears altogether.

2. Brandt's reagent: 0.3 Gm. sodium selenate in a mixture of 8 C.c. of water and 6 C.c. of pure sulphuric acid. If the preparation containing solanine is first warmed, then on cooling it becomes first violet-red, then orange-red and yellow-brown, the color finally disappearing.

3. Pure sulphuric acid as a macro-chemical reagent; but this test has no advantage over the other two.

Solanine has found in nine species of Solanum and three of Scopolia. In the tubers it is found chiefly in the neighborhood of the "eyes." In the vegetative portions it occurs in greatest abundance in the young tissues, and in the mature tissues it is usually entirely wanting except in the neighborhood of the buds and of the origin of the roots.

In the floral organs the reverse is the case, the quantity of solanine increasing for a time in both calyx and corolla as the flower opens, but ultimately disappearing from these organs, while it continues to increase in the green, unripe fruit, diminishing again when the fruit is ripe, and being then localized chiefly in the peripheral layers.

The seat of the solanine is the cell cavity, where it occurs in the form of a soluble salt, and from which also it penetrates the cell wall by diffusion.

The author regards solanine as a product neither of primary synthesis nor of disorganization, nor as a secretion or excretion, nor as a reserve substance, nor as a transporting form like asparagin, but as an intermediate stage in the series of chemical changes which the already formed plastic substances undergo in the living cell. In the flowers and unripe fruits it undoubtedly also serves as a protection against consumption by animals.—*After Pharm. Journ.*

Chromic Acid as an Alkaloidal Reagent.

In a recent issue of the *Pharmaceutische Zeitung*, K. Mezger gives particulars of the use of a 5-per-cent solution of chromic acid in testing alkaloids, especially cocaine. If to a solution of three-quarters of a grain of cocaine hydrochlorate in 80 minims of water 5 drops of the chromic acid solution be added drop by drop, a distinct precipitate forms, which redissolves without delay; but the addition of 16 minims of hydrochloric acid throws down a dark orange-colored precipitate of cocaine chromate. It is noteworthy that ecgonine hydrochlorate solution remains clear with chromic acid, and also remains clear with 92-per-cent solution of potassium chromate; so does cocaine. On the other hand, quinine, quinidine, and cinchonine salts give a yellow precipitate with the chromate, as also with the chromic acid solution; but it is noticeable that in the latter case the precipitate dissolves in hydrochloric acid and crystallizes out again. Cinchonidine also affords the same, but with potassium chromate only turbidity and finally crystallization.

With apomorphine, chromic acid gives a red-brown precipitate, which turns green in a short time; the addition of hydrochloric acid changes it to dirty brown; brucine gives a yellow precipitate, hydrochloric acid changing it to orange-yellow, the solution itself being red; strychnine gives a yellow crystalline precipitate on standing, which is not affected by the acid; veratrine gives a yellow precipitate. Atropine sulphate and the hydrochlorides of caffeine, pilocarpine, and codeine give no reactions with these reagents. Morphine hydrochloride gives a green coloration with all three reagents. These tests are sufficiently distinctive to warrant careful trial with, and advanced students may find them useful as group tests.—*After Chem. and Drugg.*

Note on a Test for Physostigmine.

JOHN C. UMNEY contributes a note on a test for physostigmine to the *Pharm. Journ.* (June 28th), from which we take the following.

Whilst working recently through the tests of the pharmacopoeial (Brit. Pharm.) alkaloids, all were found to conform readily to the various requirements mentioned in that work, with the one exception of physostigmine. The Pharmacopoeia in reference to this alkaloid reads thus: "The aqueous solution has an alkaline reaction, when warmed with or when shaken with dilute solution of potash becomes red, and when evaporated to dryness over a water bath leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red." The first and second tests were found perfectly satisfactory, but the last was quite the reverse. The aqueous solution neither left a bluish residue nor was its acidified solution in the slightest degree dichroic.

Being dissatisfied with the result of the test, I sought to ascertain the reason of its failure. The first thing that suggested itself was whether the pharmacopoeial statement might not be considered a little ambiguous, and whether it was not "the solution after shaking with potash" that should give a bluish residue. But in this case the residue was of a dirty brown color and its acidified solution not in the least dichroic. [Mr. Umney thought that possibly his alkaloid was at fault. But this turned out not to be the case. On consulting Prof. Attfield, the latter informed him that undoubtedly an alkali was needed, and advised the use of ammonia.]

The reaction was therefore performed, adding ammonia to the aqueous solution before evaporation, and the bluish residue was satisfactorily obtained, the acidified solution of which was beautifully dichroic, blue and red.

Further experiments were made with solutions of the hydrates and carbonates of potassium, sodium, calcium, and barium, all of which redden the solution of the alkaloid, but in no case was a bluish residue obtained on evaporation; whilst with other salts—as well as hydrate of ammonia the bluish residue is an ammoniacal compound with the alkaloid. On referring to the French Codex, the only other pharmacopoeia in which the alkaloid physostigmine [itself is official, I find a very similar test described, ammonia being necessary for its development. From the foregoing it will be seen that there is an omission in the text of the Pharmacopoeia of the "ammonia." It is suggested, therefore, that the test in future editions should read "when evaporated to dryness over a water bath with ammonia leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red."

A MODIFIED FORM OF PINCHCOCK.

As is shown in the cut, the modification consists in making a side bend in one of the limbs and omitting the double wire which serves as a guide in the ordinary form. The pinchcock can be opened by springing the limbs apart, and thus is readily put on a tube connected at both ends without breaking connections, and, when placed so that the tube lies in the side bend, leaves the tube open while retaining its place. The side bend was suggested by a note in *Ztsch. Anal. Chem.*, xxiv., 399.—J. T. STODDART in *Chem. News*, 1890, 224.

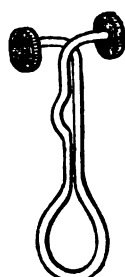
A NEW TEST-TUBE HOLDER.

THE annoyance experienced in using the common wooden test-tube holders led me some years ago to attempt to devise a holder which should serve its purpose more perfectly. The wooden holder is clumsy, its rubber band rots and is liable to give way at awkward moments, the peg becomes unglued and drops out, and even in its best estate it holds securely only medium sized test tubes. Tubes of more than 2 Cm. cannot be inserted sideways, larger ones are not taken at all, and a separate holder must be used for small test tubes and ignition tubes.

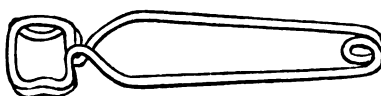
The new holder has been in use in my laboratory for four years now, and has given such good satisfaction that I venture to call attention to it in a form recently somewhat improved.

It is made of brass wire, and opens by pressure on the straight sides of the handle; its jaws open to the width of 5 Cm., and it holds firmly any tube from 5 Mm. up. It thus serves for ignition tubes as well as for all sizes of test tubes.

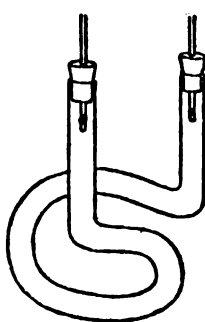
I have recently had a larger size made of stiffer wire for the purpose of holding flasks, etc. It proves very convenient as a holder of wash bottles when one is washing with boiling water, and also for holding beakers when decanting hot solutions. Both sizes are furnished by the Victor Manufacturing Co., Northampton, Mass.—J. T. STODDART in *Chem. News*, 1890, 223.



Pinchcock.



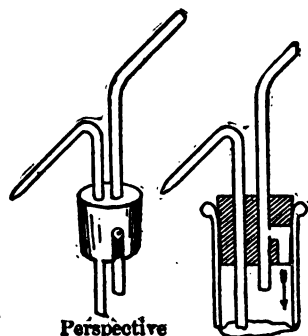
Test-tube Holder.



Absorption Tube.



Inlet tube.



Perspective

Cross-Section

Wash-bottle Valve.

A SELF-SUPPORTING ABSORPTION TUBE.

STOLBA uses absorption tubes (for drying gases, etc.) of the shape shown in the cut. A portion of the tube is bent into a flat spiral, upon which it rests when placed on the laboratory table. The two tubes passing through the stoppers are closed at the inner orifice, but have an aperture a short distance above the end. It is only necessary to draw up either tube so that the aperture is within the stopper, when the current of gas will cease to pass.—After *Zeitsch. f. ang. Chem.*

A NEW VALVE FOR WASH BOTTLES.

IN view of the fact that metallurgical and technical chemists have daily occasion to use hot acids, ammonia, and other fuming liquids in the washing of precipitates, a wash bottle which will automatically throw a prolonged stream of liquid and retain all disagreeable fumes will be appreciated by the fraternity. A strong objection to the use of a rubber bulb attached to the wash bottle is the fact that a slight rise in the temperature of the room will force the liquid out of the bottle; while the ordinary rubber valve, as described by Blair in the "Analysis of Iron," will swell and become useless in a short time when exposed to the fumes of hot acids. A very simple apparatus can be made in a few minutes which obviates both these difficulties.

A rubber stopper, doubly perforated, and of such size that it will project about a quarter inch above the neck of the wash bottle, is chosen, a lead pencil or penholder passed into one of the holes, and a small hole drilled through the side of the stopper till the borer meets the wooden plug.

A wedge-shaped channel is then cut in the side of the stopper from this side hole to its lower end. A piece of glass tubing is now closed at one end and a small opening about the size of a pin's head made in the glass an

inch from the closed end. This can be easily done by a small flame directed upon the surface of the glass, while air is blown into the tube. This small opening is made level with the rest of the tube, and the glass is bent at the regulation angle about two inches above this opening. This is then placed in the rubber stopper so that the hole in the glass tube and that cut in the stopper will coincide.

An exit tube for the escape of the liquid is made as usual, and the tubes and stopper placed in the neck of the wash bottle in such a way that, when air is blown in, it passes through the side hole in the stopper, down the wedge-shaped groove, and forces the liquid up the exit tube. A very slight rotation of the inlet tube, after the liquid has begun to flow, will close the valve, and the pressure of the enclosed air will maintain the stream, which can instantly be stopped by reversing the rotation.

If the apparatus is well made, the angle of rotation of the inlet tube is very slight, not over twenty degrees.

I have had this apparatus in use for several months, and find that it does not get out of order, is much easier to handle, and saves more labor in the washing of precipitates than any other form of wash bottle. The inlet tube is so small that no appreciable evaporation of ammonia occurs, nor does a rise in the temperature of the laboratory result in an undesirable washing of the working benches.—DAVID H. BROWNE in *Journ. of Anal. Chem.*, 1890, 141.

Thiol.

THIS odorless substitute for ichthyol appears to be gaining ground in Germany, if we may judge from the literature on the subject.

In a long paper recently communicated to the *Deutsch. Medizin. Wochenschr.*, Dr. A. Bidder gives particulars of fifty-five different cases of skin affections of various kinds in which he has used thiol with success, and Professor Ernst Schwimmer, of Budapest, speaks highly, in *Therapeutische Monatshefte*, of its efficacy in the treatment of acne and similar affections, for which he uses the thiol mixed with three times its weight of water, the solution being painted on the parts twice or three times a day.

In some cases of erythema it is advantageous to use the thiol in more

concentrated form, viz., in powder.

In eczema rubrum the application of an ointment composed of thiol 1 part, and lard 10 parts, quickly gave relief, and it seemed to be better, on the whole, than ichthyol.

Thiol is sent into the market in three forms, viz., liquid, powder, and scales.—*Chem. and Drugg.*

Capsicum as a Counter-Irritant.

DR. HENRY J. BUCK, writing to the *Lancet*, says: I have used this drug for more than twenty years—I may almost say daily—and many of my patients will not travel without a bottle of the "magic lotion," as they call it.

I find the simplest and most efficacious way of applying it is to soak a large handful of the crushed pods in half a pint of hot water for an hour, then strain and bottle for use. A teaspoonful of eau-de-cologne added will keep the solution, or it can be well boiled after preparing. I then have it applied to the affected parts on a piece of linen folded three or four times, or on lint, and covered with gutta-percha tissue or a dry flannel. In this way the lotion may be kept on for hours without vesicating, and in many cases the skin is hardly red-dened. The stinging and burning sensation produced by the capsicum lotion is, after a few minutes, welcomed by the sufferer, so magically does it often remove the rheumatic or neuralgic pain for which it is being applied. In acute torticollis a cure is often speedily obtained by covering the side affected with the application. In any form of neuralgia, rheumatism, subacute gout, pleurodynia, and such like, it will be found most useful, and may be reapplied over and over again during the day and night without any fear of vesication.

American Pharmaceutical Association.—From present prospects, the next meeting, to be held at Old Point Comfort, Va. (Sept. 8th-12th), will be attended by a very large number of members.

Lavender in Sussex.

LAST winter Mr. J. Ch. Sawyer, pharmaceutical chemist, of Brighton, exhibited fair specimens of lavender and rosemary oils distilled from plants grown by himself near Brighton. This was a new industry in that quarter, and it has attracted some attention locally as well as in pharmaceutical circles. An attempt is now being made to extend lavender cultivation in Sussex. Some parts of the county appear to be very suitable for the industry, for lavender being a plant indigenous to hill-slopes bordering the Mediterranean basin, the probability is that a locality near the sea is advantageous. The soil most suitable, according to Mr. Sawyer's experience, is light loam over chalk, even if the depth of such soil be only eight or twelve inches. It is noticeable that although a deep, rich soil produces larger plants, a comparatively poor but well-drained soil yields more flower, and the flowers are sweeter; and sloping from north to south is preferable to that sloping from east to west—a slope is in all cases preferable to a flat land or a hollow.

Several varieties of lavender may be found in gardens which to an experienced eye appear similar when not in flower. There is a variety cultivated for "bunching," but its flower spikes are considerably smaller than the true variety cultivated for distillation. There is also a variety grown as a border plant on the sea wall at Hove which is absolutely valueless as regards its flower, although more compact in growth. An acre of land properly planted will grow 2,500 plants, and yield, on an average of six years, 24 pounds of oil per year. An extra thousand plants can be crammed in, but, being cramped for room, they choke each other, they suffer for room on the third year, and may not survive the fourth; whereas if generously allowed space they will flourish for six or seven years. Widespaces between the rows and between the plants allow a circulation of air, which prevents mildew and rotting, which the plant in a shaded or cramped position is subject to; a free space also allows the ground to be kept clear of weeds, and permits the harvest to be gathered conveniently.

The harvest takes place in August, and may last all that month. The flowers, deprived of as much stalk as possible, are distilled with water, without previous maceration, the same day as cut; the otto thus obtained is clear, limpid, of a very pale straw color, and its value, wholesale, is at present about 55s. per pound. As the demand for this oil is constant; and as the amount of land under lavender cultivation seems to have decreased rather than increased of late years, possibly owing to the increased value of land near London, where most of the old farms are found; and as in Sussex (so suited to its growth) there exists much land not cultivated at all, there is surely a chance of competing profitably in this little known industry.—*Chem. and Drugg.*

California Asphaltum.

ASPHALTUM is mined to a considerable extent in California, but the annual production is quite irregular, being governed by the local demand. When a great deal of iron pipe is being laid, large quantities of the substance are used in coating it. Asphaltum is found in the counties of San Luis Obispo, Santa Clara, Ventura, and Santa Barbara. Between 2,000 and 3,000 tons a year are shipped from the deposits.

The mines of the Ventura Asphalt Company, in the Canyon Diablo, Rancho San Miguelito, have come into prominence since 1888, when they were discovered. The material is found at or near the surface. About 1,800 tons have been so far shipped from this deposit. More or less prospecting work has been done, but now large cuts or tunnels are being run into the deposit. At the point now being worked the elevation above sea level is 1,300 feet, but frequent fossils of shells, sharks' teeth, etc., are found, showing that the mass came up from the ocean.

The vein or bed crops out at many points in the shape of fingers or rounded masses connecting with the main body, the width and length of which are unknown, but upon which breasts of 45 x 16 feet have been worked.

The quality of this asphaltum is unique, possessed as it does great toughness and hardness, and a larger amount of fixed bitumen than other known deposits. The percentage of fixed bitumen is 24.40. It fluxes readily in oil, coal tar, and by hydrocarbons, and may be made permanently of the hardness of stone or the pliability of india-rubber, according to kind and quantity of flux (solvent) employed and the manner and time of melting, etc.

It has been successfully employed in street paving, and is found not to soften by heat or crack by frost. It is in use for this purpose in several cities in California, Utah, Washington, British Columbia, Mexico, Guatemala, Sandwich Islands, and Australia. For cementing masonry it has been put to use in San Francisco, Santa Barbara County, and other places. The Southern Pacific Company built a piece of sea wall along the seashore, Ventura County, which was built up of round cobbles cemented together by this asphalt. Two years' trial shows no indications of the wall being injured.

A peculiarity of the Ventura asphalt is that it is elastic.

The Santa Ana Water Company used it for plastering a reservoir, having first laid up a wall of cobblestones on puddle and then plastering this with hot asphalt. In this open reservoir no change in the material is seen; even in places where the wall settled and cracked, the coating stretched and bent, remaining perfect and sustaining the water pressure. A pile coated with this asphalt was driven at Goat Island without destroying the coating. In doing this, the weight of 3,000 pounds was dropped twenty-two feet on the pile. The material can be used for coating iron, planks, pipes, etc. Inquiries for the substance from the Eastern States, England, France, Australia, and Central America promise an important shipping business, unless other deposits with such exceptional properties are found.—*Min. and Sci. Press.*

Accidents with Kerosene Lamps.

WE take the following from an abstract of an official report by Sir F. Abel and Boverton Redwood on this subject ("Accidents with 'Paraffin' Lamps"), contained in the *Chem. and Drugg.*

The causes of explosions may be arranged under the following heads:

1. Rapidly carrying or moving a lamp, so as to agitate the oil, causes a mixture of vapor and air to make its escape from the lamp in close proximity to the flame, and, by becoming ignited, determines the explosion of the mixture existing in the reservoir.

2. Existence of an imperfectly closed filling aperture in the lamp reservoir favors explosion, owing to a vapor and air mixture being formed.

3. A sudden cooling of the lamp, owing to exposure to a draught, may give rise to an inrush of air, whereby the air space in the reservoir is charged with a highly explosive mixture, and the flame of the lamp may at the same time be forced into the air space. Blowing down the chimney to extinguish the lamp has the same effect; and if the wick be lowered very much, or the flame otherwise much reduced in size, the lamp may become heated, and its susceptibility to the effects described will be increased. Explosion in these cases is favored by the air passages being obstructed by dirt or charred wick, by the wick not being long enough to reach the bottom of the oil reservoir, and if the lamp is allowed to burn until the surface of the oil is scarcely level with the end of the wick.

4. The accidental dropping of the burning wick into the oil reservoir is a fruitful source of explosions.

5. If the flashing point of the oil used be just near the legal minimum, vapor is given off comparatively freely, but the mixture of vapor and air in the reservoir will probably be feebly explosive in consequence of the presence of an excess of the vapor; but if the flashing point of the oil be comparatively high the vapor will be less readily or copiously produced, and the vaporous mixture be more violently explosive. The effects are more violent if the quantity of oil in the lamp is small, and oil of high flashing point is more likely to cause heating of the lamp than one of low flashing point, in consequence of the higher temperature developed by the former, and of the greater difficulty with which some oils of that description are conveyed to the flame by the wick. It therefore follows that safety in the use of mineral-oil lamps is not to be secured simply by the employment of oils of high flashing point.

Sir F. Abel and Mr. Redwood state further that a loosely plaited wick of long staple cotton draws up the oil freely and regularly, and is altogether better and safer than a tightly plaited wick, and their experiments lead them to the conclusion that a lamp explosion is not usually sufficiently violent to cause the fracture of an ordinary glass reservoir, although in several recorded cases it has had this effect.

Lobeline.

To obtain the alkaloid from *Lobelia inflata*, the leaves are extracted with warm water acidified with acetic acid, the extract concentrated, made alkaline, and the alkaline solution extracted with ether. The acid extract is then treated with water, rendered alkaline, and again extracted with ether. After distilling off the latter, the alkaloid remains as a viscous, honey-colored oil, with a smell akin to that of honey and tobacco. For further purification the oil is dissolved in ether, extracted with water acidified with hydrochloric acid, the acid extract then rendered alkaline, and the resulting solution again extracted with ether.

After distilling off the ether, the residue is dried over caustic alkali and distilled in a current of hydrogen. When lobeline or its sulphate is suspended in a 10-per-cent caustic potash solution and a 4-per-cent solution of potassium permanganate is gradually added, the whole being gently warmed on the water bath, benzoic acid results, which can be extracted by means of ether after filtering off the manganic hydrate and acidifying the resulting solution. The identity of the acid formed with benzoic acid was proved by analysis and by its characteristic properties, whence it appears that lobeline contains an aromatic nucleus. Further investigations on lobeline are in progress.—H. PASCHKIS and A. SMIDT, *Monatshfte*, 11, 181; *J. Soc. Chem. Ind.*

Liquid Chlorine as an Article of Commerce.

The recent improvements in methods for producing chlorine, on a large and economic scale, from chloride of magnesium, immense quantities of which are rendered available particularly at the extensive Stassfurt mines, have been instrumental in starting a new industry, viz., the manufacture of liquid chlorine and its easy transportation. Heretofore the production of chloride of lime and other substances requiring a continuous application of large quantities of chlorine gas, had to be conducted at the place where the latter was generated. Hereafter it will be possible to carry the gas, in a compact shape, to such factories or places as may require it. Of course, in the manufacture of chloride of lime it is not likely that the new method will displace the old one for some time to come. But chlorine is required for many other purposes; and if it can be transported without loss or risk there are many technical branches in which the chlorine will be preferred to chloride of lime. Indeed, as is well known, the latter is merely a convenient form of storing and handling chlorine. If the free chlorine obtainable from a hogshead of chloride of lime can be confined and transported in a vessel holding a quart, this will be a decided advantage.

The chlorine gas, after having been liberated by a simple process from the chloride of magnesium, is pumped into an apparatus where it is perfectly free from moisture by contact with sulphuric acid, and forced, under strong pressure and proper cooling, into a steel receptacle or fountain, in which the liquefied chlorine is stored and shipped.

It has been found that *dry* chlorine does not act upon cast iron, wrought iron, steel, phosphorus bronze, brass, copper, zinc, or lead, either alone or in presence of concentrated sulphuric acid.

For transport, liquid chlorine is best forced into iron or steel vessels. When the gas is wanted these vessels are connected with suitable conduits, so arranged that no moisture can reach the interior of the vessels.

Shaving Soap.

DIETERICH gives the following formula (in *Pharm. Centralhalle*):

Beef Tallow	400 parts.
Cocoonut Oil	200 "
Sol. of Soda, sp. gr. 1.260	340 "
Sol. of Potassa, sp. gr. 1.260	60 "
Oil of Caraway	2 "
" " Bergamot	2 1/2 "
" " Lavender	1 1/2 "
" " Thyme	1 "

Melt the tallow and cocoonut oil together, cool to 50° C. (122° F.), add the alkaline lyes, warm gently, and stir during half an hour, or until the mass is uniform and homogeneous; then incorporate with it the essential oils. Dieterich directs, besides, 5 drops of essence of myrobalans for each kilo of the mass. But this may be omitted.

Gum Arabic and Gum Senegal.

GUM ARABIC is often adulterated with gum senegal, the latter being sometimes sold in its stead. If the gum has not been powdered, the appearance is sufficient to show which variety is chiefly present. Gum arabic forms round or irregular masses, varying in color from colorless to brown, which reflect light strongly, almost appearing to be crystalline. Gum senegal is usually colorless or pale yellow, with a surface resembling ground glass, the pieces cylindrical or worm-like. It occurs occasionally in round masses resembling a mulberry.

On dissolving either gum in water, only small particles of wood are left, which, according to Kramsky, are usually red in the case of gum arabic, but black with gum senegal. Other gums, cherry for example, are only partially soluble in water, leaving a swollen residue which only dissolves after long digestion.

With potassium hydrate and a few drops of copper sulphate solution both gums give a blue precipitate, which in the case of gum arabic is larger in quantity, coherent, and rises to the surface, while the other is more flocculent and remains diffused in the liquid. The precipitates are only slightly soluble on heating, and are not reduced even by boiling. Dextrin yields a similar precipitate, easily soluble on warming, and which is completely reduced on boiling for some time. On prolonged heating with dilute potassium hydrate, solutions of gum arabic and of dextrin become amber colored; those of senegal are only slightly colored.

Mixtures of gum arabic and senegal behave to the copper test like senegal alone, but with potassium hydrate they assume the amber color. Mixtures of gum arabic or senegal and dextrin with the copper test behave like gum arabic alone, and if the amount of dextrin is not too small reduction takes place on boiling. When only small quantities of dextrin are present the copper precipitate, after thorough warming, may be filtered off and the filtrate boiled; reduction will then take place. When all three substances are present the precipitate should be washed,

dissolved in dilute hydrochloric acid, and a large excess of alcohol added. The precipitated gum is allowed to settle for a day, washed with alcohol, dried, and examined as above.

Gum arabic may be systematically examined in the following manner: The powdered substance is treated with lukewarm water; a gelatinous residue indicates other gums. The aqueous solution is mixed with an excess of potassium hydrate and a few drops of copper sulphate, warmed and filtered, and the filtrate examined for dextrin by boiling; the precipitate being tested as above.

It is usually stated that gum senegal is more hygroscopic than gum arabic, but when dried at 105° C. gum senegal lost 13.39 per cent of water, and gum arabic 14.56; and on exposure to moist air for twenty-four hours the former gained 6.15 per cent, the latter 6.34.—L. LIEBERMANN in *Chem. Zeit. (J. Soc. Chem. Ind.)*.

A Process for Purifying Alcohol and Alcoholic Liquids in General.

ACCORDING to this invention alcoholic liquids are freed from impurities by treatment with a basic tartrate followed by a hyposulphite (thiosulphate). Tartrate of potassium or sodium, or, preferably, the double salt known as Rochelle salt, may be used. Among the hyposulphites, those of barium and sodium have given excellent results. The alcoholic liquid, contained in a suitably closed vessel, is mixed with small quantities of the tartrate, being well agitated after each addition, until it reacts neutral or faintly alkaline to test paper. The impurities are now allowed to settle, which requires from a few hours to several days, according to circumstances; but in any case the operation is considerably hastened by the application of heat or by the action of light. Hyposulphite is now added in quantity equal to about one-third of the tartrate used. The liquid is well stirred and allowed to settle, when the clear portion may be drawn off and rectified in the usual way. This process is applicable to all kinds of alcoholic liquids, notably wines and rum, the flavor of which is greatly improved. Engl. Pat. 12,186 (issued to P. C. Rousseau and others).—*J. Soc. Chem. Ind.*

Oil of Nutmeg and Oil of Mace.

F. W. SEMMLER finds that the specific gravity of oil of nutmeg (which he obtained from Schimmel & Co., of Leipzig) is 0.8611 at 15° C. It consists of several terpenes. The vapor density was found to be 138, theory for $C_{15}H_{22}$ requiring 136.

Oil of mace consists of a number of constituents. Only the higher boiling ones are the carriers of the odor. The specific gravity is 0.9306 at 14° C. Among the constituents are the same terpenes as exist in oil of nutmeg; myristicol (containing oxygen); a stearopten having the odor of mace and possessing the composition $C_{15}H_{22}O$, which the discoverer names myristicin. (This name was formerly applied to a supposed stearopten reported to exist both in oil of nutmeg and oil of mace, but in this sense it is no longer recognized.)—After *Berichte*, 1890, 1803.

Estimation of Mercuric Chloride in Sublimate Dressings.

GUILLLOT proposes the following method for determining the quantity of corrosive sublimate in dressings (*Journ. de Pharm.*, 1890, 542):

Carefully weigh 50 Gm. of the fabric or dressing, introduce it into a glass funnel (or small percolator), and extract it with alcohol of 80 per cent until a few drops of the percolate are no longer precipitated by stannous chloride. The alcoholic percolate is now evaporated in a porcelain capsule at a temperature of about 80° C., after addition of a little water and enough aqua regia to prevent the reduction of the mercuric chloride by some organic matter which has been extracted by the alcohol along with the mercury salt. When about 40 C.c. of liquid remain, it is passed through a filter and the filter washed first with water acidulated with aqua regia, and finally with pure water. The united liquids are placed into a conical glass vessel (provided with a stopper), supersaturated with ammonia, and then treated with sulphide of ammonium. The precipitate settles well at a temperature of 60° C. This is collected upon a small, unplaited filter of 9 Cm. diameter, previously dried at 100° C., and weighed. It is washed with distilled water until the washings no longer contain any chlorine or sulphide of ammonium, as shown by the failure of nitrate of silver to give any reaction.

Next the precipitate is washed with pure, highly dilute hydrochloric acid. This removes certain impurities, particularly ferrous sulphide. Washing with water is continued until no more iron is detected in the washings. The filter is finally dried and weighed at 100° C. It is advisable to insure the absence of free sulphur by treating the precipitate with carbon disulphide previous to drying.

By multiplying the weight of mercuric sulphide found with 1.168, we will find the amount of mercuric chloride in the 50 Gm. of fabric taken.

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EDITORIAL.

IT is now recognized by all who have had experience in the management of educational institutions, particularly of the higher grades, that a good library, accessible to those connected with the institution, is as important a feature as the staff of professors and lecturers. When the student has passed the point up to which all his time had been taken up with the acquisition of the fundamentals of general or special knowledge, and when the period arrives at which he feels an incentive for independent inquiry and research, a well-stocked and readily accessible library becomes one of the most important factors in his education. Taking cognizance, for the present, only of those institutions which may be supposed to be more in affiliation with the majority of our readers, namely, colleges and schools of pharmacy, we can state that we have had ample opportunity, for many years past, to observe the benefits that may be derived by the students and others attached to such an institution from a good reference library. Students must not only be taught facts in the lectures, recitations, and at the laboratory tables, but they must also be trained to learn how to search through the existing literature for information on any subject that may be under consideration or discussion. This must be learned by practice and experience, like anything else, but it cannot be learned if the sources of information, that is, the reference works, are not at hand. But if they are, it soon becomes a pleasure and charm for the student to follow up reference after reference, and to accumulate abstracts or extracts covering the available information on the subject he is inquiring about, as far back as he finds it desirable or necessary to go.

There is, as yet, no school of pharmacy in this country which possesses what may be called a complete or perfect working library—such a library, for instance, as that of the Surgeon-General's Office possesses on the field of medical literature. Yet there are some which seldom fail to supply the desired information. Without intention to detract from the value of other libraries, it may be safely stated that, so far as a "working library" is concerned, that of the College of Pharmacy of the City of New York is not excelled by any other in the country. Care has always been taken to place on its shelves the

most complete and exhaustive works in all departments of knowledge and art bearing upon practical or theoretical pharmacy, and its fundamental sciences, botany and chemistry. By carefully watching the tendencies of those who have occasion to consult it, the gaps which frequently reveal themselves are being gradually closed up, so that many a research may be begun and ended without necessitating a visit to any other library. We speak of this subject here for the reason that we have recently been consulted by gentlemen connected with two similar institutions regarding the most desirable works to form the foundation of a good reference library. Our advice has been somewhat detailed, more so than would be suitable for publication here. But the general principles which we at that time laid down may be quoted here, as they will no doubt be approved by competent judges.

1. In laying the foundation of a library—which has to be increased by gradual purchases as funds become available—the first care should be to procure the most important encyclopædic works, that is, those which treat of a science in the most complete and exhaustive manner. For instance, in chemistry, the large treatises of Roscoe and Schorlemmer (in English), Gmelin-Kraut or Graham-Otto (in German), should be procured; also Watt's Dictionary (English), Fehling's and Ladenburg's Dictionaries (in German), Beilstein's "Handbuch d. Organischen Chemie," and works of this kind, without which no research can be conducted. In botany, the fundamental works should be: Linné's works (best in form of Richter's "Codex Linnæus"); Decandolle's "Prodromus," with its modern continuation; Baillon's "History of Plants" and his botanical dictionary; Bentham and Hooker's "Genera Plantarum"; Engler and Prantl, "Pflanzenfamilien"; Gray's "Flora" and "Manual," etc., etc.

2. Every opportunity should be made use of to acquire sets of valuable periodicals, more particularly of those which are known to contain many important original papers. When an author's paper is to be consulted, the original should be referred to, and not some abstract or extract made from it in another periodical. While there will generally be but little difficulty in acquiring for the library the current issues of the more important literature—for instance, in chemistry the Journal of the Chem. Society, Chemical News, Amer. Chem. Journal, Berichte der Deutsch. Chem. Gesellschaft, Annalen der Chemie, Chemisches Centralblatt, Comptes Rendus, etc., etc.—the acquisition of complete sets of some of these and similar journals will entirely depend upon the availability of funds, which would have to be supplied in a rather large amount. However, this should or need not be done until the library has been further extended in other directions.

In pharmacy, besides the latest editions of treatises on practical pharmacy, and commentaries on the pharmacopœia (dispensatories), there should be procured the latest editions of the principal foreign pharmacopœias, with the best commentaries written thereon. It is much more easy to extend this part of the library, since the works which it may from time to time be found necessary to add are usually procurable with little trouble and without incurring great expense.

3. When the standard works for general reference have been procured, then the library may be extended in various specified directions. For instance, under Chemistry, it may be extended to analytical chemistry (Fresenius, Allen, Prescott, Classen, Curtman, Simon; The Analyst, Journ. of Analyt. Chemistry, Zeitschrift f. Analyt. Chemie, etc.). Under Botany, to medical botany (Bentley & Trimen, Lueresen, Baillon, Koehler's "Medicinalpflanzen," etc., etc.); to pharmacognosy (Maisch, Flückiger & Tschirch, etc.); also to materia medica, and to the literature of special subjects (Cinchona, Opium, etc.).

4. Care should be taken to procure and file all government publications that may be obtainable; all ephemeral publications, such as pamphlets, which are of any value. But no funds should be expended upon ordinary college text books or elementary works, as a reference library is no place for these.

5. If possible, all departments should be kept advancing at about equal rates. As soon as an important work appears which decidedly supersedes a work of reference

often consulted by users of the library, it should be procured.

6. While, as a general rule, care should be taken to procure reference works as far as possible composed in the language with which most of the users are mostly familiar, it is a cardinal rule not to regard the language it is written in if a particular work is the most exhaustive and best that has been written on some subject. The number of languages among which the choice usually falls, in the sciences which are to be represented in a library of a school of pharmacy, is very limited, and there will be no difficulty for any one who desires to consult a work written in one of these languages to find some one who will extract the desired information for him. The information is there; it is only a question of how to get it out. But if the information is wanted, and the book it can be obtained from, even at some trouble, is not there, the research is cut off at the very beginning.

FLUOROFORM has recently been announced as a new discovery by Meslans (see page 165 of this number). So far as publication is concerned, the priority appears to belong to this author. But the discovery itself is not new, having been made some five or six years ago by Prof. Charles O. Curtman, of St. Louis, Mo., who prepared the gas by means of iodoform, and exhibited it to members of the senior class of the St. Louis College of Pharmacy; also to Dr. Frerichs, a former assistant of Prof. Woehler. He also announced the discovery at a meeting of the Verein Deutscher Aerzte of St. Louis.

Conversion of Tropicidine into Tropine.

LADENBURG announces (*Ber.*, 1890, 1780) that he has succeeded in producing from tropidine a strong base which, when treated with tropic and hydrochloric acids, yielded a substance having the characteristic properties of atropine. He believes that it is tropine, but merely announces the above facts—without being at present sure of the tropine—to save priority. It will be remembered that tropine is a direct decomposition product of atropine (which can be split into tropine and tropic acid), and that it is the only link yet wanted for the synthetic production of atropine.

The Phenylhydrazin Test for Sugar in the Urine.

DR. J. A. HIRSCHL has taken up the defence of the phenylhydrazin test for sugar in urine which was first recommended by Prof. Jaksch, of Prague, and which has since then been declared by several authorities as not fully reliable.

When phenylhydrazin is brought in contact, under certain conditions, with sugars (dextrose, levulose, lactose, etc.), it enters into a chemical compound with them. These compounds have a characteristic color, are crystalline, and are very permanent. With dextrose or glucose, phenylhydrazin forms a substance known as phenylglucosazon. This crystallizes in yellow needles, which are either single or grouped in bunches. Sometimes this compound, formed as a precipitate, appears to the naked eye to be amorphous, but when viewed under a lens the crystalline character is at once perceived.

In the case of urine containing sugar, there is often produced, under certain conditions, a precipitate consisting of various-sized yellow lamellæ or brown globules strongly refracting light, which must not be confounded with the sugar precipitate.

It is this secondary precipitate which has induced other experimenters to regard Jaksch's reagent as unreliable. Hirschl has now ascertained the conditions under which the secondary precipitate may be best distinguished from the principal one, when sugar is present.

Introduce 10 C.c. of the suspected urine into a test tube, add about 5 grains of the phenylhydrazin hydrochlorate and 10 grains of sodium acetate, and promote solution by warming. Then place the test tube into a boiling water bath, and allow it to remain therein for one hour. Then remove it, set it aside, well corked, for several hours or over night, and examine the sediment under the microscope.

If no sugar was present, the sediment contains no yellow crystals, but is amorphous, brownish-yellow or brown, soluble in alcohol and insoluble in water.

If sugar was present, the amorphous precipitate just mentioned is mixed with more or less of the characteristic yellow crystalline needles of phenylglucosazon.

The delicacy of this reaction no doubt exceeds that of any other one known. In aqueous solutions of pure glucose the limit of the reaction is at 0.003 per cent. In urine, however, less than 0.03 per cent cannot be recognized. This is 1 in 3,333.

The author points out that hydrochlorate of phenylhydrazin, which was recommended by E. Fischer, is preferable, for this test, to the acetate, which was originally proposed by Jaksch.—*Zeitschr. f. phys. Chem.*

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,472.—Indigo-Blue Hectograph Ink (Several Inquirers).

We have, for some time past, been using a new kind of ink for polygraph purposes. Having become dissatisfied with the ordinary violet ink, and desiring to replace it by a blue one, we tried at first every kind of blue aniline color accessible in the market. None of them, however, was fully satisfactory, some being too dull in color and others not being lasting enough, that is, yielding only a small number of good copies. It occurred to us next to try to combine several colors, not exactly with a view to obtain a blue, but rather a very dark and persistent green color. In one experiment we found to our surprise that the addition of green to methyl violet, in certain proportions, resulted in the production of a very handsome blue. The reason of this, in our opinion, is that the green neutralizes the red of the violet, which latter is composed (mainly) of red and blue, and that, therefore, the blue tint alone remains. The tint is, however, much intensified by the presence of the neutralized mixture of green and red. After some further trials we found the following combination to produce the best results, furnishing an ink which yields polygraphic copies of a very fine, brilliant indigo or "navy" blue. The names of the colors are those used in the trade.

Brilliant Green, crystals.....	3 parts.
Hofmann's Violet, 4 B.....	3 "
Glycerin.....	1 part.
Water.....	10 parts.

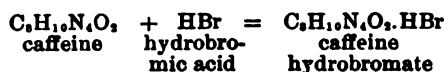
Mix the two coloring matters in a mortar, and reduce them, if in lumps, to a moderately fine powder. Transfer this to a tared flask, add the glycerin and water, and heat the flask on a water bath, frequently agitating, until the colors are dissolved. Then allow the flask to cool, replace it on the scale, and restore the loss of water. Transfer the product to small vials.

Since a little of this ink lasts a long time, it is best to keep it in small vials, since the bulk would, by gradual evaporation, become too thick, and the lost water could only be replaced by guess.

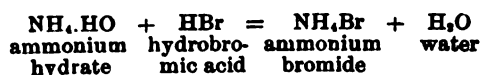
Ink stains produced by it upon the hands, etc., may be readily removed by washing with alcohol strongly acidulated with acetic acid.

No. 2,473.—Bromide of Caffeine (Philadelphia).

When alkaloids combine with acids to form salts, the hydrogen of the acid is not displaced, as is the case with oxides or other compounds. For instance, while potassa (KOH) and hydrobromic acid (HBr) form potassium bromide (KBr) and water (H₂O), caffeine and hydrobromic acid unite without loss of a single molecule of each constituent:



In order to express by words the fact that the hydrogen of the acid has not been replaced, it is customary to leave the prefix "hydro" attached to the name of the acid. It is true that such a salt was formerly, and is even sometimes yet, called a "bromide." But strict application of the rules of chemical nomenclature restricts the term "bromide" to a combination of *bromine* (Br; not hydrobromic acid, HBr) with an element, or a radical acting like an element. Thus NaBr is "sodium bromide"; C₆H₅Br is "phenol tribromide." The confusion of the terms "hydrobromate" and "bromide" arose, no doubt, from the ambiguous nomenclature of the ammonium salt in former times, when the old chemical notation was still in vogue. NH₃ is ammonia; when this combines with hydrobromic acid (HBr), the resulting salt was considered a combination of the two molecules, unchanged, thus: NH₃.HBr. It was therefore natural to call the salt "hydrobromate of ammonia." On the other hand, those who regarded NH₃ as the radical in ammonium salts explained the formation of the salt thus:



The same salt was therefore called, often indiscriminately, by two names, either "hydrobromate of ammonia" or "bromide of ammonium," and the same duplicity of appellation obtained also in the case of the iodide, chloride, sulphide, etc. From this the ambiguous nomenclature was transferred to the alkaloidal salts. In consequence we meet with such terms as "bromide of morphine." It has more recently been shown that, in such

combinations, the term "hydrobromide," "hydrochloride," etc., is the most suitable one.

The price lists of several manufacturing chemists and wholesale dealers have for a long time quoted such alkaloidal salts promiscuously as "bromide of morphine," "muriate (= hydrochlorate) of quinine," "bromide of caffeine," etc.

True hydrobromide or hydrobromate of caffeine can be obtained in definite crystals (see E. Schmidt in *Lieb. Ann.*, 217, 283; and *Berichte*, 14, 814). It has the composition $C_8H_{10}N_4O_5 \cdot HBr \cdot 2H_2O$. Like most other caffeine salts, it splits up into its components when it is dissolved in water.

No. 2,474.—**Lacmoid and Lacmoid Paper** (Philadelphia).

This artificial coloring matter has been on trial for several years as a substitute for litmus, and has in many instances been found to possess advantages over the latter.

The commercial lacmoid, however, is of very variable composition, sometimes hardly yielding any blue water-soluble color at all. Dr. Otto Foerster has recently made lacmoid a subject of special study, and finds that the commercial substance always contains a violet or blackish coloring matter which cannot be separated from the blue by precipitation. A good criterion of its quality is its rate of solubility in boiling water. If it yields only a little blue color to the latter, it should be rejected. If it shows that it contains a sufficient quantity of the blue coloring matter, it is best purified in the following manner.

It is first treated with cold alcohol until this no longer removes anything. Next it is extracted with water, the aqueous solution filtered and evaporated. The residue is again dissolved in water, filtered, and the filtrate precipitated with absolute alcohol containing a little glacial acetic acid. The precipitate is collected upon a filter and washed with alcohol, which removes a red coloring matter soluble in alkalies with violet color. The whole process of solution, precipitation, and washing is once more repeated to remove as much of the red color as possible. The final residue is now dried upon the filter, being meanwhile repeatedly moistened with alcohol to expel the acetic acid. Finally the residue is dissolved in alcohol, the solution filtered, precipitated with alcohol containing very little ammonia, collected on a filter, washed with alcohol, and dried.

Such purified lacmoid is soluble in alcohol with a pure blue color, and in pure water (free from CO_2) with a ruby-red to violet color. These tints are exceedingly clear, and the least transition from alkalinity to acidity, or vice versa, is sharply detected.

Lacmoid paper (as a substitute for litmus paper) is prepared by impregnating filtering paper with an alcoholic solution of pure lacmoid, to which enough sulphuric acid has been added to render the impregnated paper red instead of blue. But an excess of acid must be avoided; it should be only in such quantity that the paper, on drying, acquires a blue tint again. The concentration of the solution should be such that the impregnated and dried paper will have a color resembling in quality and depth that of a forget-me-not. In order to prepare red lacmoid paper, it is best to first treat the paper with very dilute sulphuric acid and then to dry it; but it is quite difficult to make the impregnated paper retain its red color. Still, by sufficiently acidulating the solution it may be accomplished. The dried, impregnated paper should have a rose-red tint.

Comparative experiments by Dr. Foerster have shown that there is but little difference in the delicacy of the reaction between blue litmus and blue lacmoid paper, but that red lacmoid paper far exceeds red litmus paper in delicacy.

Lacmoid is sold in the market at about \$2.00 per ounce.

No. 2,475.—**Constituents of the Onion** (M. C. W.).

The onion has been chemically examined by Fourcroy and Vauquelin, who first obtained the ethereal, sulphurated oil, and also ascertained the presence of a peculiar sticky substance coagulable by heat, besides sugar, free phosphoric acid, etc. Afterwards it was examined by R. Schwarz, who found also a small quantity of citric acid. The only recent quantitative analyses we can at present refer to are those by W. Dahlen and R. Pott (quoted in the work "Chemie der menschlichen Nahrungs- und Genussmittel," von König; Berlin, 1889, i., 710). The mean of the results obtained by these chemists is as follows:

Red Onion, fresh, containing 85.99 per cent of water. Nitrogenized constituents, 1.68 per cent. Fat, 0.10. Sugar, 2.78. Extractive free from nitrogen, 8.04. Cellulose or lignose, 0.71. Ash (mineral constituents), 0.70. [There is also present about 0.25 per cent of an acrid essential oil, containing sulphur.] In 100 parts of the dry substance there are 12.25 parts of nitrogenized constituents, representing altogether 1.96 parts of nitrogen.

No. 2,476.—**Schuster's Alkalimeter** (M. C. W.).

One of our subscribers asks us to give him an account or a description of Schuster's alkalimeter. This is not

known to us. Perhaps some of our readers can supply the information.

No. 2,477.—**"Red Gum"** (R. M. Co.).

This name is applied to several species of *Eucalyptus*, more particularly to *E. rostrata* Schlecht., which tree is also known under the name of "Flooded Gum." But "red gum" is also, and more properly, used to denote a red sap, liquid or coagulated, which is obtained in large quantities from *Eucalyptus resinifera* Smith, and also other species of *Eucalyptus*. It is known also under the names *Eucalyptus Kino*, *Australian Kino*, *Botany-bay Kino*. Large quantities of this are exported to London, where it may, no doubt, be obtained. We are not aware that it is regularly used in this country. It is, no doubt, an efficient astringent, since it resembles genuine kino chemically.

No. 2,478.—**Indelible Ink** (C. E. R.).

A good indelible ink, suitable for your purposes, may be made as follows:

Nitrate of Silver.....	1 oz.
Acacia.....	1 "
Water.....	1 fl. oz.
Water of Ammonia.....	2 fl. oz.
Carmine.....	30 grains.

Dissolve the acacia in the water of ammonia, and the silver salt in the water. Mix the two solutions. Triturate the carmine with a small quantity of the solution, and gradually add the remainder until the carmine is dissolved.

The object of adding carmine is merely to color it so that the writing made with the ink may be seen. India ink may be used in place of carmine.

When fabrics have been marked with this ink, the places written upon should be gone over with a hot sad-iron.

It may also be applied by means of a stencil or rubber stamp. In this case the ink should be thickened by adding about one ounce of acacia.

No. 2,479.—**Elixir of Pepsin and Bismuth** (M. M. M.).

This subscriber wants a formula for a permanently clear elixir of pepsin and bismuth, containing in each fluidrachm 5 grains of the former and 1 grain of citrate of bismuth and ammonium.

Mr. M. does not specify whether 5 grains of undiluted or of saccharated pepsin are intended. But as we should consider 5 grains of undiluted, or so-called "pure" pepsin too much of a dose, we assume that the saccharated is meant. The latter, however, varies so much in strength that "5 grains" is an exceedingly indefinite term. Even a stated quantity of the "pure" is a rather indefinite amount. We may consider that 5 grains of the best commercial saccharated pepsin is about equivalent to 1 grain of the ordinary kind of undiluted pepsin. Of course, if we compare it with the best, then 1 part of "pure" pepsin would be equivalent perhaps to 20 or 30 parts of the saccharated.

These remarks being premised, we would recommend to our correspondent to follow the formula for elixir of pepsin and bismuth given in the National Formulary, No. 83 (page 28), using 1 grain of "pure" or undiluted pepsin per fluidrachm, and reducing the citrate of bismuth and ammonium to one-half. The formula would then be:

Pepsin (undiluted).....	128 grains.
Citrate of Bismuth and Ammonium.....	128 "
Water of Ammonia.....	q. s.
Glycerin.....	2 fl. oz.
Alcohol.....	8 "
Syrup.....	4 "
Compound Elixir of Taraxacum.....	1 "
Purified Talcum.....	120 grains.
Water.....	enough to make 16 fl. oz.

Dissolve the pepsin in 4 fl. oz. of water. Dissolve the bismuth salt in 1 fl. oz. of warm water, allow the solution to stand until clear, if necessary; then decant the clear liquid, and add to the residue just enough water of ammonia to dissolve it, carefully avoiding an excess. Mix the two solutions, and add the glycerin, elixir, and alcohol. Thoroughly incorporate the talcum [or use in place of it precipitated phosphate of calcium] with the mixture, filter through a wetted filter, and pass enough water through the filter to obtain 13 fl. oz. To this add the syrup.

Ferrocyanides of the Alkaloids.—Only within the last few years has any attention been given to these compounds, and now Professor Beckurts describes the characters of a number of such salts which are all acid ferrocyanides. That of atropine is an amorphous powder insoluble in alcohol; of quinine, a greenish powder insoluble in alcohol, ether, or chloroform; of cocaine, a white, amorphous powder difficultly soluble in water, insoluble in alcohol and ether; of morphine, a white, crystalline powder, assuming a bluish tint on exposure to the air, readily soluble in water. So far these compounds have not found any practical application but possess a certain theoretical interest.

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Whole No. 196.

AMERICAN PHARMACEUTICAL ASSOCIATION.

THE thirty-eighth annual meeting convened at Old Point Comfort, Va., on Monday, September 8th, 1890, at 3 o'clock P.M., President Karl Simon presiding.

Mr. T. Roberts Baker made an address of welcome on behalf of the Virginia State Pharm. Association, to which Mr. W. M. Alexander made a suitable reply.

The president then called upon the Committee of Arrangements to report regarding the proposed sessions and entertainments. A report having been rendered, the president delivered his address. He expressed the deep regret of the Association at the death of its elected president, Emlen Painter, alluding in eloquent words to his personal worth and earnest labors in behalf of the welfare of the profession to which he belonged. He suggested that a committee be appointed to draw up suitable resolutions expressive of sympathy with the family of the deceased.

Commenting on the action taken by the Pharmacopœial Convention in regard to the metric system, he observed that it would no doubt give rise to much unfavorable criticism by druggists who have been too long wedded to the old system to be wholly separated from it. But, no doubt, "the requirements of science demand the change; it is more convenient than the old, and all that is necessary for the pharmacist to do is to provide himself with sets of metric weights and measures for his prescription case, and the change can be easily made."

It had been expected that a great many of the newer synthetic remedies and compounds would be accepted and introduced into the new Pharmacopœia. The manufacture of some of these articles being under patented processes justifies the action of the convention in excluding them, to a certain extent, but there are so many of these compounds which have a very important hold upon the medical profession that it is to be regretted that they cannot be incorporated in the new Pharmacopœia. With the majority of pharmacists this would be the only source of information in regard to these preparations, and it is to be hoped that the committee will find a way out of the difficulty, perhaps by adding a supplement on the subject.

With regard to the committee appointed two years ago to visit the American Medical Association, some information may be expected, in their report on the action taken by that body, which would be of great interest to the pharmacists of the country, who are anxious to know the attitude taken by the medical profession towards them. Much is to be expected from the new section on *Materia Medica and Pharmacy* which has been established by the American Medical Association.

At the next convention of that Association, at Washington in May next, the Am. Pharmaceutical Assoc. would be represented by a strong committee, so as to be thoroughly informed on subjects coming up for discussion. These subjects would not be so much questions of trade pharmacy, or counter-prescribing by druggists, etc., as the desirability of having uniformity in medicines and improvements in quality. One of the objects of the union should be to make the U. S. Pharmacopœia and the National Formulary the national authorities for the dispensing of medicines. The subject of the indorsement of proprietary preparations by medical men, afterwards to be used by shrewd manufacturers to push such preparations in the well-known "cure-all" manner, should also receive attention, since pharmacists often had more reliable information on the monopolistic character of such preparations than the physician.

The Section on Legislation will evolve some plan in the near future which will insure more uniformity in our pharmaceutical laws as well as in the curriculum followed by the various colleges of pharmacy throughout the United States. It has been reported that the interchange of certificates of one State Board with another would be very difficult. At a convention of the secretaries of the different State Boards which would be held at this meeting, this matter would be carefully considered.

The recurring and vexatious matter of procuring suitable apprentices would also receive attention from this section.

The Commercial Section has many important questions before it. It would be of interest to have a report from this section on the co-operative movement, which has existed for some time in Chicago and some other large cities. It would be of interest to druggists in other large cities who have to contend with the grievous evil of cutting prices. The purely trade branches of pharmacy are more and more drifting into the hands of the general dealer, and that the drug stores are not increasing in the same ratio as formerly in the larger cities is the best proof that there is no money in it. Here a rigid system of apprenticeship would come into play, as it would shut

the door to many a person who wants to enter the profession for the mere dollars he thinks are in it. It is these uneducated and incompetent persons who are injuring the drug business. The Association has an immense field to draw on for support, and considering that there are over 30,000 drug stores in the United States, and, on an average, two qualified pharmacists to each, the Association has a comparatively small number among its membership. This fact is due, in a great measure, to the lack of proper information, on the part of pharmacists, as regards the objects of the Association. The State Associations should therefore work vigorously to spread a knowledge of the objects of the national organization.

A suggestion had been made that every president of a State Association be made a vice-president of the National Association. Such an arrangement would enlist the interest of some thirty-odd presidents of such associations, and bring them to the annual meetings.

Ex-President Alexander had offered some valuable suggestions on the question of finance, on the strength of which a committee had been appointed to formulate a system of financiering which would take care of all future contingencies.

A communication was received during the past year from the Montpellier Academy, France, concerning the celebration of its sixth centennial, and inviting the Association to send delegates to participate in it, to which a reply had been sent, expressing regret at our inability to do so, and extending suitable congratulations.

A notice had been given, at the last meeting, of an amendment to the by-laws which would amalgamate the sections on Pharmaceutical Education and Pharmaceutical Legislation, and which would be considered at this meeting.

The president concluded his address by thanking Messrs. Ebert, Hallberg, and Bedford, and Secretary Maisch, for the many acts of kindness and valuable assistance rendered him in the performance of his duties.

On motion of Mr. Ebert, the president's annual address was received, and ordered to be referred to a committee of three, to be appointed by the chair, for consideration and report on the suggestions contained therein.

Messrs. Dohme, of Baltimore, Md., Gordon, of Ohio, and Ebert, of Illinois, were thereupon appointed as such committee.

Mr. G. W. Kennedy, Secretary of the Council, read a list of seventy-eight applicants for membership. On motion, they were invited to join the Association.

The Committee on the Revision of the Pharmacopœia, and the Committee to Visit the National Wholesale Druggists' Association, announced that they had no formal report to present.

The same statement was made by the Committee on the National Formulary.

The question of appointing a Committee on Nominations being brought up, attention was directed by the president to the provision of the by-laws according to which each State (not State Association) was entitled to two representatives on the committee, which would involve a preliminary agreement of all members present from any one State, as to the two members who should represent the State on the Nominating Committee.

Before the roll was called Mr. Alexander gave notice of an amendment to the by-laws (chap. ix., art. xi., sec. 7), in which the words "who are not delegates"—in the passage reading "in addition to which he shall appoint five members who are not delegates, to act with the committee"—are to be dropped.

The Nominating Committee was then appointed from the names presented by the several States (through the united action of the members from each State).

On motion of Mr. Sheppard, the Nominating Committee was authorized to fill vacancies in this way, that each State could nominate a substitute for any member who was unable to serve.

The president next directed the attention of the Association to the fact that this was the first time in its history when its presiding officer died during his term of office.

Prof. Bedford thereupon gave some details regarding Prof. Painter's lamented death and the causes leading thereto. He also emphasized the loss which the profession has incurred through Prof. Painter's death, and truthfully characterized the strong individuality of the deceased.

Ex-President Alexander, who had become acquainted with the deceased more in a professional than in a social way, and who had become strongly impressed with his firm character and zeal for all that is true and noble, likewise added his testimony to the universal verdict regarding the deceased.

Other members, who had had much opportunity to cul-

tivate Prof. Painter's acquaintance or to enjoy his friendship, likewise made suitable remarks—among them particularly Prof. Remington, who had been a classmate of the deceased and had graduated with him.

Prof. Bedford announced that a crayon portrait of the deceased was expected to arrive at the present place of meeting.

The treasurer next presented his report, which showed a total income, from all sources, of \$10,511.39, and a total expenditure of \$6,370.82, leaving a balance on hand, on July 1st, 1890, of \$4,140.57.

Prof. Remington then read the report of the Committee appointed to visit the American Medical Association. The main feature of this was the announcement that the Association had, at its last meeting in Nashville, established a section on *Materia Medica* and Pharmacy, with the same privileges as other sections, the chairman being Dr. C. V. Woodbury, of Philadelphia.

A vote of thanks was tendered to the committee.

On motion of Mr. Hallberg, the present committee, consisting of five members, was continued and instructed to represent this Association at the next meeting of the Medical Association.

A discussion then arose as to whether State Associations were intended to be invited to attend these meetings, in addition to the American Pharmaceutical Association as a national body. Mr. Hallberg announced that he had received information on the strength of which he notified the State Associations that they would be admitted.

Mr. Ebert gave formal notice of an amendment to the constitution (art. iii.), by inserting after the words "permanent secretary" the words "and assistant secretary." This amendment, under the rules, to lie over for one year.

On motion of Prof. Whelpley, the privileges of the floor were extended to those members of the Committee of Revision of the Pharmacopœia—which was then holding sessions at the same place of meeting—who were not members of the Association.

The meeting then adjourned.

Second General Session, Tuesday Morning, September 9th.

The convention was called to order at 11 A.M. by President Simon. The reading of the minutes, by the secretary, of the last session having been heard, and, on motion, accepted and approved, the report of the Nominating Committee was presented by Mr. Alexander, the chairman, as follows:

President—A. B. Taylor, Philadelphia, Pa.

First Vice-President—A. B. Stevens, Ann Arbor, Mich.

Second Vice-President—Charles E. Dohme, Baltimore, Md.

Third Vice-President—J. M. Good, St. Louis, Mo.

Permanent Secretary—J. M. Maisch, Philadelphia, Pa.

Treasurer—S. A. D. Sheppard, Boston, Mass.

Members of Council—P. C. Candidus, Mobile, Ala.; C. F. Goodman, Omaha, Neb.; H. M. Whelpley, St. Louis, Mo.

Reporter on the Progress of Pharmacy—C. Louis Diehl, Louisville, Ky.

On motion the report was approved, and the secretary instructed to cast an affirmative ballot for the election of the officers named.

The secretary then read the report of the Committee on Credentials, which, on motion, was approved and accepted.

Also the minutes of the Publication Committee, which were duly accepted.

The secretary then read a list of thirty-five names of proposed members, who, on motion, were invited to join the Association.

Mr. Sheppard moved that the amendment to the by-laws offered by Mr. Alexander, striking out the words "who are not delegates" from sec. 7 of art. xi., ch. ix. of the by-laws, be adopted. (Seconded and carried.)

Mr. Ebert gave notice of an amendment to art. ii., ch. viii. of the by-laws, inserting on line five thereof, after the word "paying," the words "an initiation fee of five dollars," and then continuing, "and the annual contribution for the current year."

On behalf of the Committee on Prize Papers, Prof. Patch reported as follows:

In regard to the Ebert prize for the best paper submitted, a question has arisen in our minds as to what the prize was to be given for. Assuming, however, that it was the intention of the originator of the prize that it should be given every year to the author of that paper which was the most original in investigation and opened up the newest field of discovery, your committee is unanimous in awarding the prize to the author of "The Coloring Principle of Flowers," Mr. W. T. Wenzell, of San Francisco, Cal.

On motion the report was adopted.

Mr. Eliel moved that the chair appoint a committee of five on the time and place of next meeting, which was seconded and carried, and the chair appointed Messrs.

Goodman, Alexander, Whitney, Sheppard, and Heinitch as such committee.

The report of the Committee on the President's Address was presented, as follows:

"Your committee, to whom was referred the president's address, respectfully report as follows:

"1. We recommend that a committee of five be appointed to draw up suitable resolutions in reference to the death of our late president, Mr. Emlen Painter.

"2. That the sections of Pharmaceutical Education and Pharmaceutical Legislation be combined in one.

"3. We approve of the meeting of our Committee on Legislation with a conference of the State secretaries to form some plan for legislation whereby the certificates of State Boards of Pharmacy may be made interchangeable.

"4. We do not approve of the plan proposed in the address in reference to electing presidents of State Pharmaceutical Associations vice-presidents of this Association. This would require a complete change in the laws that govern our organization."

On motion the report was taken up by sections.

On motion of Mr. Hallberg the first section was amended to provide that a phototype of the late president be included in the report of the proceedings of this year's meeting.

The section was then adopted.

The second, third, and fourth sections were also, on motion, adopted.

The chair appointed as a Committee on Resolutions on the death of the late president, Messrs. Bedford, Remington, Gordon, Alexander, and Ebert.

Mr. Ebert remarked, at this point, that he thought, pending the return of the report on time and place of meeting, a discussion would be of value on the question of finance. He thought the initiation fee should be increased in order to enhance the funds of the Association, and that its decrease some years ago had not been a wise move. He therefore made a motion that the Association's admission fee be increased to five dollars. (The motion was seconded.)

Mr. Thompson stated that, as the originator of the decrease in the admission fee, he would explain that it was done with the idea that a higher fee might keep many prospective members from joining the Association; that it was better to have the co-operation of one hundred men at two dollars than fifty at four dollars. He did not think, however, that it was right to charge any admission fee whatever.

Mr. K. King said there was no necessity for devising means of increasing the finances of the Association. He had lately discovered—though he might have known it before—that, according to the by-laws, there was a life-membership fund which, up to this time, has not been used, but allowed to accumulate, and it was also stated that it should be used for current expenses when necessary. He was in favor of reducing the admission fee of the Association to one dollar a year, if by so doing the strength of membership could be increased.

Prof. Whelpley said it hardly seemed just that any pharmacist could join the Association and take an equal interest in the property owned by it, merely by signing the constitution, which would place him on an equal footing with the oldest member. Let those who come in later pay for the privilege. He opposed any reduction in the fee.

Mr. Ebert said he merely brought the matter up for an informal discussion. When put to a vote, if the motion were carried he would make a formal motion amending the by-laws in the manner suggested. If lost, he would not press the matter.

The question was then put to a vote, and was lost.

Mr. Goodman presented the report of the committee on time and place of the next annual meeting, as follows:

"Your committee on the time and place of the next meeting respectfully report that New Orleans as the place has been selected, and the second Monday in May as the time for holding same; and also present a minority report recommending St. Louis, and the time the second Monday in May."

The report elicited considerable discussion, some members speaking in favor of St. Louis. But, in view of the fact that the extreme South had not before been visited, the majority report was finally adopted.

The secretary read a communication from the secretary of the Virginia State Pharmaceutical Association, in session at the Hygeia Hotel, inviting members of the American Pharmaceutical Association to any of its sessions, with all the privileges of the floor, which on motion was accepted, and a vote of thanks tendered the Virginia Association.

The time of holding the meeting was then again brought forward for discussion, Mr. Washburn pointing out that some State Associations held their meetings in May, and recommending to postpone it to October.

Mr. Finlay, of New Orleans, stated that this would be an improper time to convene in that city, and advised to select any time before the 1st of June.

Prof. Remington then moved to select the first instead of the second Monday in May, which was agreed to.

Third General Session, Tuesday Afternoon, September 9th.

The convention was called to order at 3 P.M.

The minutes of the last session were read and approved.

The secretary read an invitation from the Virginia State Pharmaceutical Association, inviting the members of the American Pharmaceutical Association to be present at a lecture to be delivered before that body by Prof. Remington on the Metric System, at 11 A.M. Wednesday, September 10th.

On motion the invitation was accepted and referred to the Committee on Scientific Papers.

The convention then adjourned its general session to give place to the Section on Commercial Interests.

Fourth General Session, Wednesday Morning, September 10th.

The convention was called to order at 10 A.M.

The permanent secretary read the minutes of the last general session, which on motion were approved.

Messages from the Chicago College of Pharmacy and the Kings County Pharmaceutical Society were received and duly acknowledged.

The secretary of the Council presented sixteen names of proposed new members, who on motion were invited to join the Association.

On motion the general session adjourned to give place to the Section on Scientific Papers.

SECTION ON SCIENTIFIC PAPERS.

First Session, Wednesday Morning, September 10th.

The chairman, Prof. Whelpley, on calling the section to order, requested Prof. Stevens to act as secretary pro tem., the secretary being absent.

An invitation was extended to the Virginia State Pharmaceutical Association to attend the session.

The chairman then delivered his annual address. He spoke of the practical value of the section, and hoped that no paper would be referred without discussion.

He had discovered that most authors who wanted to present papers preferred to have them printed before the meeting. It was a good plan, as better copy was produced in the reports. If that could not be done, he recommended that papers be typewritten.

A request which had been made to authors of papers to prepare a synopsis in advance had not met with a general response. In presenting papers to the Association, the reading of such a synopsis not only saved time, but gave a better opportunity for discussion.

Some contributors had also failed to understand that a paper becomes the property of the Association as soon as it is received by the section, and that the author loses the sole control of its publication elsewhere. Another point is the presentation of papers which have been previously read and accepted at State pharmaceutical associations. He was aware that a subject could be discussed at more than one association, but papers which had already been offered at another association should not be presented to the American Pharmaceutical Association. All papers admitted to this section must be especially prepared for the Association.

Last year a recommendation had been made that questions be presented to the A. P. A. for discussion at this section, and it resulted in only two being offered.

He suggested that a committee be appointed early in the opening of the session to solicit queries from members present at the convention, and report the same to the chairman of the Section on Scientific Papers within thirty days after the adjournment of the convention.

Prof. Remington then moved that a committee be appointed to report on the address of the chairman, which was seconded and carried.

The chair appointed on the committee Messrs. Remington, Uhlich, and Sheppard.

The nomination (but not election) of chairman and secretary for the ensuing year was next taken up, the election to take place after the opening of the next session, when further nominations could be made if desirable.

Prof. Remington nominated as chairman Prof. E. L. Patch, of Boston. (Seconded.)

Mr. Ebert nominated Mr. Hurty, of Indianapolis, as secretary.

Mr. Behrens nominated Mr. Hallberg, of Chicago, as secretary. (Seconded.)

A paper entitled "A Review of the Various Methods of Percolation," by J. W. Eckford, was presented and read. Regarding some of the statements made by the author, some criticisms were made by Messrs. Shinn, Lloyd, Markoe, and others.

At this point the committee appointed to visit the Virginia Pharmaceutical Association reported that the invitation presented had been accepted by that body, and its members would be present to hear the lecture of Prof. Remington in company with the convention.

Mr. T. J. Milner presented a paper on "The Fluid Extract of Ipecac," of which the following is an abstract:

"The experiments of the writer were in the line of extraction of the drug by alcohol of various strengths—following the methods of Rother and Robbins, and testing the resulting percolate for the amount of alkaloid as compared with amount of total alkaloid. The same drug when tested showed that when the strength of the alcohol was over 4 parts of alcohol to 1 of water, the amount of emetine was diminished in the finished product."

The section at this point adjourned to hear the address of Prof. Remington on the Metric System.

A paper entitled "The Constitutional Obligation of Congress regarding Weights and Measures," by Oscar Oldberg, was then presented and read.

Accompanying this paper the writer submitted the following resolution, the adoption of which he moved:

Whereas, The Constitution of the United States imposes upon Congress the duty of establishing fixed standards of weights and measures for the use of the people; and

Whereas, The customary weights and measures in use in the United States are arbitrary, unsystematic, inconvenient, and indefinite, being governed partly by English law, partly by tradition, and partly by chance; and

Whereas, No laws of the United States exist establishing a national system of weights and measures or fixing the values of the customary units; therefore be it

Resolved, by the American Pharmaceutical Association, That Congress be and is hereby respectfully requested to consider without unnecessary delay the importance of legislation upon this subject; and further

Resolved, That it is the sense of this Association that it would be worthy of the dignity of the American nation to celebrate the four hundredth anniversary of the discovery of America by the adoption of the decimal system of weights and measures in all governmental transactions and for purposes of foreign and interstate commerce, to take effect on the date of the landing of Christopher Columbus on this continent; and

Resolved, That copies of these preambles and resolutions be forwarded by the secretary of this Association to the Speaker of the House of Representatives of the United States, to the Chairman of the Committee on Coinage, Weights, and Measures of the House of Representatives, and to the Superintendent of the Bureau of Weights and Measures.

Prof. Sayre next read a synopsis of a paper on "The Loco Weed," in which he detailed a number of experiments which had been made in Colorado and New Mexico with a view to discover the nature of its poisonous properties, if any existed. Nothing definite had yet been ascertained as to whether such poisonous qualities were contained in the plant. This refers to the poisoning of cattle and sheep on our Western prairies. Locomism, briefly described, is a demented condition into which the animal gets, which is attributed to a plant called loco, a Spanish word meaning "crazy." The plant has been fully described in a former paper.

At this point the convention adjourned.

Second Session, Wednesday Afternoon, September 10th.

—The convention was called to order at 3 P.M.

The election of officers for the ensuing year took place, Prof. Patch, of Boston, being elected chairman, and Mr. Hallberg, of Chicago, secretary.

A paper by Dr. Adolph Tsheppe, entitled "Albuminate of Iron and its Preparations," was presented and read.

Dr. Eccles, on motion duly seconded, was permitted to read a lengthy synopsis of a paper on "The Action and Properties of Pepsin," accompanied by an exhibition of specimens and certain experiments showing the cause of precipitation.

In his paper the author claimed that there was not yet a perfect pepsin on the market, that the article was of very variable quality, and that, briefly described, the best pepsins were a mass of foreign substances with only a little real pepsin in them. The therapeutic value of the pepsins was very uncertain, as shown by the experiments detailed, in connection with which he mentioned the products of certain manufacturers.

At the conclusion of the presentation of the synopsis of this paper Messrs. Fairchild and Tsheppe criticised the remarks of the author, and denied the correctness of certain statements made by him; among them chiefly the assertion that coagulated albumen readily dissolves in acidulated water without the presence of pepsin.

Mr. Seabury made the suggestion that the Publication Committee confer with the author of the paper, and have the different samples numbered, so that any investigator who wished to continue the experiments could communicate with the author and obtain the names privately. They should not appear in the report. (Seconded and carried.)

Prof. Remington presented the report of the Committee on the Chairman's Address, which unanimously indorsed the recommendations therein made. On motion the report was approved and accepted. The section then adjourned.

Third Session, Wednesday Evening, September 10th.—Owing to the large amount of unfinished business re-

maining from the last session, the section held an extra session, meeting at 8 P.M.

Mr. Seward W. Williams read a paper entitled "Belladonna Plasters."

Mr. D. L. Haigh presented a lengthy synopsis of a paper on "Adulterations of Oil of Rose," in which he stated that from a number of experiments he had found it impossible to obtain a pure article of oil of rose. In experiments made on a number of samples obtained from the Kizanlik district of Turkey, and through Schimmel & Co., of Germany, of the native roses of that country, he had found that either oil of copaiba or gingergrass was used generally as an adulterant, besides others in smaller proportions. The oil from the northern countries was always found to contain a greater percentage of stearopten than that from southern countries. In assaying the oil for ordinary purposes of perfumery, it is necessary to take out all the stearopten, and if it contains 40 or 50 per cent the loss is great.

The "French" oil is stated to be the only pure oil found on the market. This is oil of rose made in the Kizanlik district, and, having its first market in France, the French take their choice of this oil. The French also make an oil which, while claimed to be free from adulterant, was found to be quite high in stearopten, and, like certain of the German oils, was adulterated with oil of rose geranium and pelargonium.

The oil is not adulterated in this country, but by the manufacturers abroad, who distill the adulterant with it. The chief adulterant is oil of copaiba, which could not be distinguished by odor. Gingergrass was the oldest adulterant used. The oil was also adulterated in the Turkish districts where it was produced, and it was only by having agents on the spot and using extreme care that the dealers could prevent this.

"Utilization of the Soda Products of Kentucky" was the title of a paper presented by Dr. Burnham, in which he described the appliances used in the working of the product, its increasing value, and the extent in which it was found in the Kentucky deposits.

Mr. Whelpley presented a paper on "The Preparation of Syrup of Tolu," by B. Traverse, of Saybrook, Ill.

The MS. copies of papers on "Economy in the Preparation of Iodoform" and "A Pharmaceutical Test of Iodoform," by Mr. S. R. Boyce, were presented and not read, being referred to the Publication Committee.

Mr. Maisch presented a paper on "The Ethereal Oil of Polygala."

Mr. F. A. Thompson presented a paper entitled "What are the Medicinal Qualities and Purity of Terebene in the Commercial Article?"

A paper entitled "On the Emetine Valuation of Fluid Extract of Ipecac" was presented by Mr. W. Simonson.

Fourth Session, Thursday Afternoon, September 11th.—The fourth meeting of the Section on Scientific Papers was called to order at 4 P.M. on Thursday.

Mr. T. M. Connor presented and read a paper entitled "Pharmacists as Food Inspectors."

Dr. H. H. Rusby then read a paper on "Cascara Sagrada and its Allies," accompanied by an exhibition of the barks, leaves, etc., of the species. This paper was very favorably commented on by several members present. The author announced that its publication without illustrations would be practically useless. He announced that the cuts would soon be available, and the paper could then be published by anybody desiring to do so.

A short paper on "The Preparation of Citrate of Magnesia," by Mr. Stevens, of Brooklyn, was read.

Papers entitled "The Florida Phosphate Fields," by H. Robinson, M.D., and "Allotropy of Silicon," by Henry O. Cushman, were presented without reading.

The new officers of the section were then installed. Secretary Hallberg, in acknowledging the honor of election, stated that Prof. Patch, the newly-elected chairman, who was absent, had requested him to name the following committee for the section during the year, to confer with members with reference to receiving papers and queries for discussion in the section:

New York, Dr. Eccles and Mr. De Forrest; Baltimore, Messrs. Dohme and Cushman; St. Louis, Messrs. Whelpley and Good; New Orleans, A. L. Metz; Wisconsin, Adam Conrad; Cincinnati, Messrs. Lloyd and Simonson; Boston, C. R. Botell; and as associate of the committee, J. R. Tucker, of Boston.

Mr. Maisch moved a vote of thanks be tendered the retiring officers for the satisfactory manner in which they had conducted the business of the section during the past year, which was seconded, and carried unanimously.

The section then adjourned.

The Section on Pharmaceutical Education and Legislation convened on Thursday evening at 8.30.

Some papers not presented at the Scientific Section were distributed at this session, viz.:

"Pseudotsuga Douglasii, Carrière, as a Substitute for Quercus Suber," by A. O. Ingalls.

"What Amount of Sand is Present in Commercial Asafoetida?" by W. A. Puckner.

Prof. N. M. Whelpley presented a paper entitled "Synopsis of a Course in Microscopy for Pharmacists."

The section then adjourned.

Fifth General Session, Friday Morning, September 12th.

The convention was called to order at 10 A.M.

The minutes of the last general session were read, and on motion approved.

Mr. Alexander presented a supplementary report of the Committee on Nominations, placing in nomination Mr. A. K. Finlay, of New Orleans, as local secretary of the Association.

On motion the report was adopted, and the secretary instructed to cast the vote of the Association for the election of Mr. Finlay.

Mr. Sheppard made a motion that the local secretary be empowered to make all preparations for the next annual meeting, with authority to appoint his associates on the committee, which was seconded and carried.

Prof. Remington offered the following resolution: "Resolved, That a committee of five be appointed with power to act on and consider the resolutions of Prof. Oldberg (contained at the end of his paper on the metric system), and to report what action this Association should take in endeavoring to secure the adoption of the metric system by the government," which was seconded and adopted.

Mr. Hallberg offered the following resolution: "Resolved, That it is desirable that the International Pharmaceutical Congress may meet in Chicago in 1893; that a committee be appointed to report upon the matter at a future meeting, and that a hearty invitation be extended to the pharmacists of all countries."

The resolution was adopted.

Mr. Canning announced that at the last session of the Commercial Section the following committee on that section was appointed: S. A. D. Sheppard, Geo. W. Voss, L. Myers Connor. Also the following committee to confer with the Proprietors' Association and the Nat. Wholesale Druggists' Association: W. S. Thompson, Washington; J. A. Millburn, Washington; D. M. R. Culbreth, Baltimore. And as a Committee on Mutual Insurance: Messrs. H. M. Whitney, Mass.; L. Eliel, Ind.; Louis Dohme, Md.; John Ingalls, Ga.; and D. L. Haigh, Mo.

The president then appointed Messrs. Alexander and Shinn a committee to wait on the new officers and conduct them to the platform.

Mr. Alexander, in introducing the new president, Mr. Albert B. Taylor, of Philadelphia, stated that he was one of the two surviving members of the first convention, which met in 1852, and might fairly be considered one of the fathers of the Association.

Mr. Taylor, who was received with great applause, said:

Gentlemen, Members of the American Pharmaceutical Association:—I find myself unable to express my feelings for your generous reception. I thank you most sincerely for your kindness in calling me to preside over your deliberations, and can truly say that I esteem it the highest honor I have ever received. I am proud to say that I have been a member of this Association from its formation in 1852 to the present time, and have always taken a warm interest in its success and advancement. I have always been willing to contribute my small share to the common stock, and, while accepting this high and honorable duty, I do so with great diffidence. I promise you, however, that I will use my best endeavors to facilitate the business and advance the interests of this Association.

Messrs. Stevens, vice-president; C. E. Dohme, second vice-president; and J. M. Good, third vice-president, were next installed, and responded briefly, thanking the Association for the honor conferred.

Mr. Alexander, in speaking of the re-election of Permanent Secretary Maisch, said that it was unnecessary to introduce him.

Mr. Maisch: I think, Mr. President and Gentlemen, that it was at your meeting in the year 1857 that I first attended a convention of this Association. I was then a younger man than I am at the present time. They put me to work at once in various directions, and finally, in 1865, selected me, in Boston, as permanent secretary. I have held that place ever since. Notwithstanding the rejection of my recent resignation by this Association, I assure you that I will discharge the duties of the office with the same fidelity that I have done in the past.

Mr. S. A. D. Sheppard, as treasurer, was introduced, and in thanking the Association for his re-election, spoke of the very satisfactory condition of the finances of the organization, remarking that one of the most gratifying features was the membership fund, which showed that a majority of the members had already paid the dues for 1890.

Mr. Finlay, elected as local secretary for New Orleans, being introduced, said: I thank you for this evidence of good-will extended to me, and can assure you that I will do everything I can to make the meeting of next year a success; and having the best material to work upon, I know that the conclusion of the Association will be, after having visited our city, that it was good to be there. I can guarantee you a warm welcome.

Mr. Eliel: I would suggest that the secretary does not make our reception there quite too warm (laughter).

Prof. Remington read the following communication

from the president of the Section of Pharmacy of the American Medical Association :

"In conformity with the action of the American Medical Association at Nashville, your Association is invited to send delegates to attend the meeting at Washington in 1891. I hope that your Association will be able to send twenty-five or thirty members, who will all promise to contribute to the proceedings of this new section, and make it a great success."

He offered the following resolution :

Resolved, That in response to the invitation of the president of the Section of Materia Medica of the American Medical Association, there be appointed by the president of this Association twenty-five members, who shall serve as delegates to that section at its next meeting at Washington in 1891.

Mr. Haigh inquired whether the representation from the American Pharmaceutical Association would prevent delegates attending from the State Associations, as these organizations had expected to send representatives to that association.

Prof. Remington replied that he was unable to state at the time whether the president of the section had the power to invite delegates from the State Associations, but he would, at an early date, confer with him, and, if he were at liberty to do so, he would recommend that the secretaries of the State Pharmaceutical Associations be addressed and invited to send delegates to the meeting of the American Medical Association.

On motion of Mr. Bedford it was provided that the committee appointed have power to fill any vacancies occurring in their number.

Mr. Simon moved that, as a committee of five had already been appointed to attend the meeting of the American Medical Association, twenty additional names be added to that number as the proposed committee, which motion was seconded and carried, and Prof. Remington's resolution adopted.

Mr. Good moved a vote of thanks be tendered the local secretary and Committee of Arrangements for their excellent work in providing for the entertainment of the Association, to the members in Virginia, and to Lieut.-Col. Frank, of Fortress Monroe, which was seconded and carried.

Mr. Diehl was introduced, and thanked the Association for his re-election as reporter on the progress of pharmacy.

On motion of Mr. Markoe, a vote of thanks was tendered the retiring officers of the Association for their valuable services during the past year.

The minutes of the last session were then read and approved.

Prof. Remington moved that, inasmuch as the Association was not informed of the time of the meeting of the American Medical Association, and as it was important that a strong representation should attend such meeting, which would decrease the attendance at the next convention if the dates of meeting were the same, power be given the council to change the time of meeting of the American Pharmaceutical Association in the event of a clashing of dates, which was seconded and carried.

On motion of Mr. Ebert, the Association then adjourned, to meet in the city of New Orleans on the first Monday in May, 1891, unless the council orders otherwise.

SECTION ON COMMERCIAL INTERESTS.

First Session, Tuesday Afternoon, September 9th.—Mr. Eliel, chairman of the section, called the meeting to order and delivered his annual address. In it he deprecated all attempts toward repealing the U. S. revenue tax.

Regarding the rapid growth of the so-called proprietary pharmaceuticals, he denounced such as a detriment to pharmacy, and recommended that a committee be sent to the American Medical Association to ask them to cooperate and assist in checking the evil.

Regarding cutting in prices, the recommendation was made that a committee be appointed to confer with the Wholesale Druggists' Association and Proprietors' Association, and endeavor to put a stop to it.

On motion the address was received and referred to a committee, on which the chair appointed Messrs. Eckford, Nattans, and Canning.

The secretary of the section (Mr. Smith) read his annual report, in which he referred especially to the matter of shorter hours, and urged the action of the meeting upon the subject.

He referred to the Minneapolis and Ramsay County Associations' joint address (issued some time since) dealing with rate cutting, and the selling of pharmacy goods by other than drug stores at cost, recommending a system of boycotting to check it.

Mr. Seabury : At the time we had the Champion fight there were lots of men in that plan that were dishonest, and when I discovered that I withdrew, and kept on my own special plan, as I always propose to do. When you talk about cutting, you may sit here until you are black in the face. You will never be able to do anything with

the manufacturers or anybody that puts up perfected packages that can be sold to any one, until you stand together like a Roman phalanx—manufacturer, proprietor, and retailer—and each for himself, and act honestly by each other. Heroic treatment should be tried. When a cutter comes into a town, let the local trade unite, and when he cuts, meet cut by cut until he gets tired of it, and that will remedy the matter.

Mr. Nattans : Isn't it a fact that at that time it was not the retailer who was at the bottom of the failure of the Champion plan? I took an active interest in that matter, and remember distinctly that it was the wholesaler, and in the very city of New York that the whole thing was knocked in the head. I think it might have been successful but for the wholesaler.

The Chairman : We have a communication from the secretary of the Manufacturing Proprietors' Association on this very subject, in response to a letter which was written by the chairman of this section. In it he says : "It has been my privilege to witness for several years the working of the several plans which have been suggested for the prevention of cutting of prices of proprietary goods, and the many obstacles which have prevented them from successfully working. It is admitted that a great majority of the proprietors and jobbers would be willing to adopt any practical scheme which would result in driving the aggressive advertising department house out of the drug business."

Unless there is any objection, this communication will be referred to the same committee as that to which the report of the Minnesota Associations has been referred.

Mr. Manning : Unless we can devise some plan wherein the proprietor, retailer, and jobber will work unitedly, we shall do nothing. There is no doubt in my mind that if the Champion plan had had the united support of all three it would have been in existence to-day, and would have been a complete success. I think the dealers themselves helped largely to down it. The time seems to have come when the three interests can unite and some definite action be taken.

Mr. Canning : I want to say, as one of the committee appointed on this matter, that at present I see no possible way for this committee to bring in any practical plan for its remedy. Papers and resolutions may be handed to us, but, so far as I am concerned, no practical plan can be devised.

Further, while I agree with many of the sentiments expressed by the resolution of the Ramsay County Association, I do not approve of the spirit of boycott it expresses, and there is the objection that they simply say to the proprietor, "You must keep your goods from the cutter." That is easier said than done. How is the proprietor to keep his goods from the cutter when he himself does not sell them? There are many proprietors to-day who will not sell their goods to cutters, but the goods get into their hands through a middle source. Therefore, I say, to succeed in preventing it, united action must be had. Now, I would suggest a conference on the subject between all three organizations—the American Pharmaceutical Association, the National Wholesale Druggists' Association, and the Proprietors' Association—so that some practical plan may be provided. The individual action of one interest alone will accomplish nothing, for that has been tried and has failed.

Mr. Main : As one of the representatives of the National Wholesale Druggists' Association, I would say that it seems to me that the solution of this difficulty lies in the direction outlined by Mr. Canning. There are proprietors in this Association, and also jobbing druggists, who refuse to sell to cutters. The great trouble, as Mr. Seabury says, is that the retailers of the United States are not united, and without unanimity nothing can be done. What Mr. Canning has said of the Champion plan is also true. It was not until the proprietors discovered that the retail men were supplying the jobbers in New York City and elsewhere that they abandoned the scheme, after wasting much money and incurring great ill-will through the trial they had made of it.

In regard to the address of the Ramsay County Association, I want to say that I know of one or two instances where associations have called the attention of various proprietors to the fact that their goods were in the hands of cutters, and in some instances have named the jobbers through whom they supposed supplies had been obtained. In each instance the proprietors have corresponded with the jobbers, and received the assurance in many cases that no more of such goods would be sold, and that future orders would be declined.

Mr. Nattans : There are instances where the proprietor can control his goods outside of the drug trade. One is the Earl & Wilson Co., manufacturers of cuffs and collars, which cannot be bought in any store for less than the prices dictated by the proprietor. It is strange that the retail druggist cannot be so protected.

Mr. Sayre : I would like to ask Mr. Seabury whether he knows of any instances where the heroic treatment he recommends has been successful.

Mr. Seabury : I know of one, in Bethlehem, Pa., where they tried it; also in Chicago, I believe. Perhaps Mr. Hallberg can enlighten us as to that.

Mr. Hallberg: The only plan that has been in effect in Chicago is for every dealer to join hands and fight the cutter and hold up prices. After doing that, in three years one cutter died, one was closed up by the sheriff after having run three stores, and one had to take out a five hundred dollar saloon license because he sold liquor after midnight.

Mr. Sayre: How are they succeeding in Atlantic City at this time?

Mr. Seabury: We have been asked not to sell to certain people there, and have agreed not to do so.

Mr. Eliel: I had the honor to represent this Association at the meeting of the National Wholesale Druggists' Association, but did not receive great encouragement from that body. The only thing they said was, "Help yourselves, and then we will have to help you." The president of the National Proprietors' Association said: "The American Pharmaceutical Association is a representative body. You have some forty associations in the various States. Let them take united action, and send in either a petition or else representatives to our meetings authorized to speak for the associations as well as the American Pharmaceutical Association, and we will comply with whatever reasonable requests may be made." I think it can be done by united action, and that it lies within our own hands to prevent cutting, if we ask the proprietors to shut off the supplies. There is no speculation in proprietary goods. The price is the same the year round. Why can't we cut off the cutters? It is the rebate they obtain which enables them to be cutters. Cut off that, and the cutter will cease to exist. I would like to hear from Mr. Hallberg how the Chicago plan originated, and how it has worked.

Mr. Hallberg: I am unable to say whether this plan contains the germ of preventing cutting of prices, but it does enable any one who participates in the scheme to buy goods at the very lowest figure. It is simply a co-operative plan. It was put in operation about two and a half years ago. Ten proprietors, representing fifteen stores, formed an association, and one man does the buying. Weekly or semi-monthly meetings are held in order to make up lists of goods that are required of such staple proprietary articles as they sell pretty largely, and so obtain the best discounts. The buyer receives and distributes the goods. The cost of distribution on this plan will not exceed 2 per cent, and, as an average discount of 10 per cent is secured thereby, a net profit of 8 per cent is obtained. The scheme has worked so well in the two years and a half that it was finally extended to take in about thirty-five stores. Now a difficulty arises that, while it was possible for one man to buy and distribute for ten stores, it is impossible where thirty-five stores are concerned. A plan will shortly be perfected by which this may be accomplished. The great merit of the scheme is that the druggist is enabled to buy his goods as cheaply as possible. Another advantage is that, if a party has a large quantity of cigars for sale, for instance, at a very low price, an organization like this can purchase the lot. The organization has often bought as much as twenty thousand cigars, thereby saving 50 per cent. Another feature is that this association has undertaken to manufacture its own proprietary goods. They have now a list of about a dozen preparations, among which are a blood purifier, cough syrup, blackberry balsam, liver pills. They have even invested \$250,000 in soap mills for the purpose of manufacturing a line of soaps of their own, which proved profitable, I presume.

An extension of the association is contemplated which will finally embrace the larger number of Chicago druggists, each one handling the association's preparations, which will finally take in all the preparations required to supply the ordinary wants of the community in the way of domestic remedies, and a great demand will undoubtedly be created for these goods. Of course, they are to be made by members of the company under the supervision directly of the members of the company. They will bear the label of the company on them, and of course every package will be provided upon a regular, first-class proprietary medicine plan, with a circular giving information as to what other proprietary articles this company prepares. This worked, as far as it has been attempted, quite well.

Of course, these goods will be absolutely under the control of the association, so that not a dollar's worth of them will go into the hands of any one who would be liable to cut. There is also, of course, a much greater profit in such proprietary goods than in any others. It is intended to extend this plan not only in the city of Chicago, but through the State of Illinois, and even beyond that in course of time.

Mr. Williams: Mr. Eliel has stated that the rebate plan is the cause of the cutting. He is mistaken, I think; for before the rebate plan was ever heard of, cutting existed in the United States. It is impossible to organize the whole trade of the country. By the failure of the Campion plan it has been shown that such extensive organization will not succeed. The best plan I have yet heard of is that described by Mr. Hallberg, which is in operation in Chicago. Try and adopt such a plan locally and it will soon put an end to the trouble.

Mr. Nattans: I spoke of Earl & Wilson's goods just now. By their plan no such trouble is occasioned. They do not sell to the jobbers. They sell only to the men that sell to the consumer, and you cannot buy the goods if you sell under their regular retail rate.

Mr. Ebert: Mr. Hallberg has failed to give the real basis on which the druggists of Chicago are protected against cutters. The way it was done was this: A few men in one ward came together and said: "We in this ward will not sell goods for less than their market value or regular retail value," and they adhered to it. They were the nucleus. The movement spread over the city till nearly all the principal druggists in the city united and formed the Chicago Retail Druggists' Association. There are thirty-four wards in Chicago. Each ward came together and formed a central organization, framed a constitution and by-laws, elected a president, secretary, and treasurer, and a board of three directors; the dues were fixed at one dollar a year. Every ward was organized in this way. They were united with the central organization, to which the ward associations have the privilege of sending one delegate each. That organization meets once a year. The ward organizations meet once a month. This organization was effected some four years ago, and to-day there is not a cutter in Chicago outside of the department stores. According to our arrangement, any complaint as to rate cutting is made by the aggrieved party to the ward committee of three appointed for that purpose. They investigate, and take measures to prevent it if necessary. If another party in an adjacent ward causes the trouble, complaint is made to the directors of the complainant's ward, who notify the directors of the offender's ward.

Mr. Seabury: One great trouble is that, although the druggist may sell as cheap as the department stores, people will not go to him as they do to such stores, as they have an idea that they can get better bargains. Sometimes an article is advertised for sale by the department stores which they do not keep, merely for the purpose of attracting the customer, and when the article is asked for another is offered in its place.

It was here moved that the question be referred to the Committee on Chairman's Address, which was seconded and carried.

The section then adjourned.

Second Session, Tuesday Evening, September 9th.—The section was called to order at 8:30 P.M., the chairman, Mr. Eliel, presiding.

The following nominations of officers of the section for the ensuing year were made:

For President—H. J. Canning, of Boston.

Mr. Redsecker moved that the nominations be closed, and that Mr. Canning be elected by acclamation, which was seconded and carried.

For Secretary—W. M. Dewoody.

On motion of Mr. Whelpley, the nominations for secretary were closed, and Mr. Dewoody elected by acclamation.

Remarks on subjects of interest to the section being invited by the chairman, Mr. Ebert said:

One of the causes of the small attendance at State Association meetings is due to the fact that, instead of discussing practical subjects of value to the retail druggist, and by combining certain social features which would make the meetings attractive, the time is consumed in reading long-winded scientific papers, which are usually buried in the proceedings and forgotten.

Mr. James (of St. Louis): I agree entirely with the views expressed by Mr. Ebert. This matter of scientific papers is killing the State Associations. I instance the Missouri State Association, whose meeting I attended recently. Four hundred members were present on that occasion with their wives and families. Whenever scientific papers were read the audience would thin out, leaving some twenty members sitting there posing as scientists. The rest were enjoying the only holiday in the year which they got. The papers, as Mr. Ebert says, will be printed in the proceedings; if any one is interested in them, they will be found there. Therefore the social and business features should be the principal aim of these associations, for the purpose of rendering them popular and making them a lasting success.

Mr. Finlay: I cannot agree with the sentiment that the scientific features of such meetings should be subordinate to the social. No practical good can be accomplished by simply meeting for social pleasures. All civilization has been advanced by science and scientific discovery; and so with the advancement of pharmaceutical associations. If you throw aside their scientific aspect, I predict their death.

Mr. Hurty here offered the following report of the committee appointed to consider the chairman's address:

Your committee to report on the chairman's address beg leave to report as follows: As to the first suggestion, of a conference with the American Medical Association on the prescribing of pharmaceutical preparations, the committee suggests that the best results may be reached by individual work, and it is suggested, with deference to the opinion of the chairman, that it is the opinion of the com-

mittee for the simple reason that we have tried several times to have similar conferences with the medical fraternity and have invariably met with unsatisfactory results. More can be done by individual work. The pharmacist can do more in his own neighborhood, with his own physicians, than by attending conferences which would amount to nothing.

The committee recommends, as to cutting of prices of patent medicines, that a conference be held with a delegation of the National Wholesale Druggists' Association and the Proprietors' Association, and that a committee of three be appointed to represent this Association at such conference.

The committee agrees with the recommendation of the chairman relating to mutual insurance, and recommends that a committee of five be appointed to bring forward a feasible plan to be submitted at the next meeting.

On motion the report was received for consideration.

Mr. McIntyre: I think that the committee has not perhaps given the first section mature consideration. We have succeeded in getting the American Medical Association to listen to us, and in the Pennsylvania Pharmaceutical Association I know that the committees having this matter in charge have been largely guided in the hope that this Association would take some action looking in the direction of getting a more definite view of what the medical people consider as medicine. It is felt that the law has given a standing to ideas in regard to the practice of medicine which are entirely opposite to each other, and that the continual supplementing of one class of medicine by others leads to confusion. In the strength of tinctures, for instance, of many manufacturers, there is a variation when a new one is introduced by any one firm, and a physician prescribing such a tincture may fail in getting the results he desires.

Mr. Eliel: In regard to the first item, as to checking the use of the so-called pharmaceutical preparations, I would say that in some cases the formula is whispered into the ear of the doctor, but put on the package in a way that no pharmacist can put it up.

Mr. James: As a member of this Association and a practising physician, I think Mr. McIntyre's words are entitled to weight. I know that physicians are more and more inclined to listen to the advice of druggists, and I know also that there is a growing disposition for conferences for an understanding with them.

Mr. Redsecker: I have had some experience in the matter under discussion. I have taken to fighting not only patent medicines, but more particularly those preparations that are alluded to here. I mean to say that we can make just as good preparations as those of the manufacturing pharmacists, and the result has been that we have driven out of the market, as far as we are individually concerned, Bromidia and Listerine, and Fellows' Syrup of Hypophosphites, and others which we make ourselves and the physicians prescribe. We make an emulsion of cod-liver oil ourselves, and physicians in our city prescribe Ross' Cod-Liver Oil Emulsion, because our firm is Ross & Co. Some time since I received a formula from a friend which had been published in the *Druggists' Circular*, and I call it "Bromadine," and now the physicians who were prescribing Bromidia, having been sampled with it (as they are by the other fellows), are now prescribing Bromadine. The result is, we sell hardly four ounces of Bromidia in a year, because they prescribe Bromadine.

Mr. James: You have found no disposition on the part of physicians to antagonize that?

Mr. Redsecker: None whatever; they fall right in with us.

Mr. Alexander: While I think it is a very good thing to fight the fire as Mr. Redsecker has done, doesn't such a procedure increase the number of patent medicines? Does he give his neighbors his formula, so that when a physician prescribes his preparation he can have it put up at any store in his place?

Mr. Redsecker: I should state that we use the formulæ of the American Formulary. I have given the formulæ of a number of our preparations that were not published, to inquirers. The formula of Bromadine, as I explained, was published in the *Druggists' Circular*.

Mr. James: I wish to emphasize my statement that there is not among physicians that antipathy to learning that most druggists seem to think there is. The great trouble is that the matter of the National Formulary has not been properly brought before them. The only practical effort to get them acquainted with this, I believe, has been made by Prof. Hallberg, of Chicago. I believe when the matter is properly presented they will be glad to avail themselves of its advantages.

Mr. McIntyre: A thought that has not been expressed yet is this: My idea is that while we have a Pharmacopœia and a National Formulary, and have all been taught materia medica, pharmacy, and chemistry, very few of us have been taught therapeutics, and therefore I hardly think we are competent to deal with this matter in some respects. A good idea would be to induce the American Medical Association to appoint a man like Mr. Diehl to take the position of supplying a complete system of medicines for the medical profession.

On motion of Mr. Nattans the recommendation (first) of the report was adopted.

The secretary read the second section of the report.

Mr. Seabury: We spent a great deal of time this afternoon on the question of how to put a stop to cutting, and the various questions which entered into its prevention. We have a gentleman here to-night who has been engaged in that work in an adjoining territory, namely, Canada. I have pleasure in introducing Mr. Clark, of Ontario, Can., president of the college in that province, who is a delegate here.

Mr. Clark: I was very much interested in the remarks that were made by Mr. Hallberg and one or two other gentlemen. There was a good deal of practical information given to the section by this gentleman. I also approve strongly of the remarks made by Mr. Ebert. In our city we suffered from rate cutting until about 1884, when business had become so demoralized that we were forced to form a local organization, which we did in such a way that it would stick. We prepared a constitution and by-laws that took in every man except the one who wanted to take advantage of his neighbor: in six months he was glad to come before the association and agree to live up to its requirements. From this one organization we have now ten in the province. We meet once a month and have a regular form of business. We do not forget the social side. We meet in general session once a year. We do our utmost to create a spirit of harmony among neighbors in trade, and with very great success. In an association where members are suspicious of each other no good can be accomplished. You cannot do this in an organization of twenty or thirty thousand druggists, but you can do it in small organizations where interests are identical. Local interests differ, and each requires its special treatment.

On one occasion a manufacturer of proprietary goods cut rates, and on being requested by the association to end it and prevent his goods getting into the hands of rate cutters, intimated that he would run his business to suit himself. Thereupon he started sending out circulars offering these low rates. Unanimous action was taken, and whenever his goods were inquired for at the druggists' the customer was informed that they were not to be had, they were not recommended. The result was, his trade dropped off to such an extent that he became willing to do the right thing and come to our terms.

Our association has also had another beneficial effect in the matter of legislation. We found in 1881 that it took nine years to get an amendment to the pharmacy law passed by our Parliament. In 1889 an amendment was proposed and passed in six months, owing to our strong representation.

Mr. Nattans moved the adoption of the third recommendation, which was seconded and carried.

On further motion the report was adopted as a whole.

Mr. Eliel here introduced the new chairman of the section, after thanking the section for the assistance rendered him during the past year.

Mr. Canning, after thanking the section for the honor of election, said that he hoped during the coming year some feasible plan for preventing rate cutting would be devised, but he was of the opinion that only united action on the part of the three interests represented by the manufacturer, jobber, and retailer would secure this end.

Mr. Redsecker moved a vote of thanks be tendered the retiring chairman of the section. (Seconded and carried.)

Mr. Seabury moved that the section adjourn to meet in New Orleans the first Monday in May, 1891, which was seconded and carried.

The section then adjourned *sine die*.

Aristol in Ozœna.

IODIDE of thymol—or aristol, as it is called—is strongly recommended by Dr. Löwenstein, of Elberfeld, in ozœna.

He gives in the *Internationale klinische Rundschau* several cases in which this remedy proved more efficacious than any other. In one case the patient, who had previously been treated with iodoform, would have been discharged from his employment on account of the smell of the drug; aristol was then employed with the most satisfactory results, the fetor vanishing, the ulcerations healing, and the scabby crusts ceasing to form. Dr. Löwenstein makes use of insufflations, which answer very well, as aristol is a fine powder.

He also paints ulcerated spots with a mixture of 1 part of aristol in 10 parts of flexile collodion.

It is necessary to keep aristol in a dark glass bottle, as it is easily acted on by light. It may be remarked that it has a very slight but not unpleasant odor, and that it is remarkably cheap.—*Lancet*, and *Therap. Gaz.*

Moses L. M. Peixotto, a well-known pharmacist of New York City, died on Sept. 6th. He was for many years a trustee of the College of Pharmacy, and for some years its secretary. Only a few weeks afterwards, his brother, Benjamin F. Peixotto, formerly U. S. Consul, followed him in death.

The Constitutional Obligation of Congress regarding Weights and Measures.*

BY OSCAR OLDBERG.

THE weights and measures of the United States are in a wholly anarchic condition. They were inherited from Great Britain in our colonial period. We have no standards provided by our own statutes. The weights and measures we use are governed in part by English law, in part by tradition, and in part by chance. Fixed standards of weight and measure are as necessary as fixed monetary standards.

If the monetary denominations of the United States were the English pound, shilling, and penny, instead of the dollar and cent; if we were coining sovereigns instead of eagles, it is scarcely possible that we would be content to permit the standards and denominations of our money of account to be governed, as our weights and measures are, by English law, or by tradition, or by chance.

If the pound, shilling, and penny were our monetary units, we would have American laws declaring that the principal unit of our money of account shall be and shall be denominated a "pound"; that the pound, and the value of the pound, shall be a fixed amount by weight of coin gold or silver of prescribed degree of fineness; and that the shilling and the penny shall, respectively, be and represent certain aliquot parts of the value of the pound. We would go further. Our statutes would prescribe the manner in which our coin shall be minted, fixing the composition, weight, and limits of deviation in the weight, of each coin, and determining the extent to which each kind of coin shall be a legal tender of payment.

It is a matter of the highest importance to the credit and prosperity of the people that our money shall have a fixed value, which must, therefore, be prescribed and regulated by law, and not by any foreign law, since foreign law is not law to us, but by our own law.

Every civilized country has a legalized currency.

Next to money, and most intimately related to it, come the weights and measures. We cannot say that all civilized nations have laws establishing fixed standards and denominations of weight and measure, for, unfortunately, there is one exception, and one only. That exception is the proud American nation.

And yet, so important is this question of uniformity in the weights and measures in use among the people that the power to establish fixed standards for them was expressly conferred upon Congress by the Constitution of the United States. Section 8 of article i. of that instrument, in enumerating the special powers expressly reserved for Congress, places the power to establish fixed standards of weights and measures next after the vital powers to lay and collect taxes for the support of the national government, to borrow money on the credit of the United States, to regulate commerce, to provide a uniform rule of naturalization, and to coin money.

While other nations have not only provided uniform metrological values for themselves, but also steadily and consistently co-operated toward the ultimate establishment of a universal system, the Congress of the United States has not even exercised its constitutional power, or, rather, fulfilled its constitutional obligation, to establish fixed standards of weight and measure for our own use.

George Washington, Thomas Jefferson, James Madison, and John Quincy Adams gave this matter special attention, and repeatedly urged that the duty imposed by the Constitution be performed, but their appeals were fruitless.

Our first President said in his first message: "Uniformity in the currency, weights, and measures of the United States is an object of great importance, and will, I am persuaded, be duly attended to." But a century has passed, and the matter has not been attended to.

In his opening address to the first session of the Second Congress, Washington again said: "A uniformity in the weights and measures of the country is among the important objects submitted to you by the Constitution, and, if it can be derived from a standard at once invariable and universal, must be no less honorable to the public councils than conducive to the public convenience."

Thomas Jefferson, while Secretary of State, prepared, at the request of Congress, several reports on the subject. Mr. Jefferson had, as the representative of his country, resided in Paris during the great Revolution. He was of course inspired by the nobler ideas of that stirring period, one of which was a universal language of weights, measures, and money, in perfect harmony with our arithmetic. About the 20th of May, 1790, he had finished a report containing the description of a new and decimal system of weights and measures constructed by himself, which was the first decimal system of weights and measures ever devised, and in every way as meritorious as the metric system subsequently perfected in France. This report was submitted to the House of

Representatives July 13th, 1790. One of the several special committees appointed by the House during the sessions of the First and Second Congresses to consider this important subject recommended the adoption of Jefferson's decimal system; but the report went over to the next Congress, was then sent to another special committee, and there the matter ended for the time being.

Washington called the attention of Congress again to the importance of immediate legislation in this direction, and more committees were appointed. Meantime the metric system was adopted by France with the avowed purpose of finally securing, if possible, its adoption throughout the civilized world. On January 8th, 1795, the President sent to Congress a communication from the French Minister descriptive of the metric system and accompanied by copies of the provisional meter and kilogramme. The first session of the Fourth Congress referred this communication, together with Mr. Jefferson's report, to another special committee, which reported April 12th, 1796, by bill. That committee was decidedly in favor of some decimal system, but could not decide between Jefferson's system and the metric system, expressing preference for units of length and weight not materially differing from the existing foot and pound. Its report, however, practically favored Jefferson's plan, and its bill provided for—the early introduction of some system! No, for the appointment of a commission to make experiments. This bill passed the House, but on its third reading in the Senate was laid over until the next session and so lost. Afterwards more special committees were appointed, reports received, and nothing accomplished. Then the discussion of the subject ceased until after the war of 1812.

President Madison, in his message of December 3d, 1816, brought the matter before the national legislature as follows: "Congress will call to mind that no adequate provision has yet been made for the uniformity of weights and measures contemplated by the Constitution. The great utility of a standard fixed in its nature, and founded on the easy rule of decimal proportions, is sufficiently obvious. It led the government at an early stage to preparatory steps for introducing it, and a completion of the work will be a just title to the public gratitude." The Senate responded to this earnest appeal, taking some further "preparatory steps" by referring the subject once more to the Secretary of State for report. Two years passed. Then the House of Representatives followed the example of the Senate. Another special committee of the House was appointed, and in due course reported certain resolutions providing for the adoption of fixed standards, and for the appointment of a commission to carry out the plans proposed, but this commission did not favor any new system. The resolutions were not adopted.

On February 23d, 1821—thus on the anniversary of Washington's birth—an exhaustive report on the weights and measures was sent to Congress by John Quincy Adams, the Secretary of State. The whole subject was treated of in great detail, and the preparation of this report had required four years. At that time the metric system had not yet been adopted by any government except the French, and was far from popular among the French people. Nevertheless Mr. Adams concluded that "final and universal uniformity of weights and measures is the common desideratum of all civilized nations," and that the universal establishment of the French system, although "struggling for existence even in the country which gave it birth," would be a "universal blessing," adding that "it would be worthy the dignity of the Congress of the United States to consult the opinions of all the civilized nations with whom they have a friendly intercourse, to ascertain, with the utmost attainable accuracy, the existing state of their respective weights and measures, to take up and pursue with steady, persevering, but always temperate and discreet exertions the idea conceived and thus far executed by France, and to co-operate with her to the final and universal establishment of her system."

But while he thus looks forward to the ultimate adoption of the metric system all over the world, and recommends to "the Congress of the United States to labor steadily and perseveringly for the accomplishment of that end, he at the same time urges Congress to proceed at once to "such declaratory enactments and regulations as may secure a more perfect uniformity in the weights and measures now in use throughout the Union."

Things have changed since then. The metric system is no longer struggling for existence; its universal establishment is almost achieved. But Congress has failed to establish by law either the metric system or any other system of weights and measures in our country. The elaborate reports and recommendations of Jefferson and Adams have been forgotten. So far as concerns national legislation in regard to our weights and measures, the past century has been a century of hesitation, indifference, and failure. Yet the subject is more important to-day than it was a hundred years ago. Indeed, it becomes more important every day. Our nation and its industry and commerce are growing more rapidly than ever,

* Paper presented to the American Pharmaceutical Association at its annual meeting at Old Point Comfort, Va.

while the confused state of our weights and measures continues.

Instead of fixing the standards of weights and measures, Congress has evaded its duty and responsibility. Lacking the courage to decide between the past and the future, the old and the new, notwithstanding the absence of any present legally established system, our national legislators simply "resolved" that the Secretary of the Treasury furnish to the States and Territories the "standard weights and measures" they might need.

In the absence of legalized standards the Secretary of the Treasury adopted such *provisional standards* as seemed to him best. They were intended simply to fix and maintain the values of the denominations found to be in general use in the United States, until such time as Congress should see fit to pass the needed laws establishing a permanent system.

The weights and measures we use are assumed to be: the units of length legally established in Great Britain; the old wine measures and Winchester measures formerly employed in England, but abolished by law sixty-four years ago in that country; the troy and avoirdupois weights; and the old English medicinal weights and measures, which were discarded in England together with the wine and Winchester measures.

The provisional standards adopted by the Treasury Department on the recommendation of Mr. Hassler, Superintendent of Weights and Measures, in 1833, for the construction of the "standard weights and measures" to be furnished the respective States, are the following: A brass scale prepared by a Mr. Troughton, of London, for the Coast Survey of the United States, governs the standard measures of length; the Hassler gallon is the volume of 58,372.2 grains of distilled water at the temperature of 39.83° F., weighed in the air at 62° F., barometer at 30 inches; the Hassler bushel is the volume of 543,391.89 grains of distilled water of the same temperature and weighed under the same conditions as in the case of the liquid gallon; the weights are standardized by "the standard troy pound of the Mint of the United States," to which we will have occasion to refer again.

It is not improbable that the Troughton yard is identical with the English yard; and it is generally assumed that the Hassler gallon is identical with the discarded English wine gallon of 231 cubic inches, and the Hassler bushel with the discarded English Winchester bushel of 2,150.49 cubic inches, which assumption is probably not true.

Means for the accurate determination of values are indispensable to science, industry, and commerce. Fixed standards of weight and measure are as important as a sound currency. They are not only "conducive to the public convenience," but necessary to the preservation of the public morals. Hence no civilized nation can afford to leave its weights and measures to tradition, usage, and inference. Money cannot be coined without reference to weight. Our statutes of necessity define the value of the dollar, or the dollar itself, by declaring that the weight of the gold coin or silver coin shall be a certain fixed number of "grains"; yet there is nothing in these statutes to define the weight of the grain itself!

The United States has one prototype standard adopted by Congress—not to insure uniformity in our weights, but solely for the purpose of regulating our coinage, although the Treasury Department adopted it to be also a model for the construction of the standard weights. It is a brass copy of the British troy pound, procured in 1827, and used as the standard of weight by the Mint of the United States for *forty-six years before it was adopted by law!* The adoption of this brass weight as the standard of weight by the Treasury Department in 1833 does not seem to have been regarded by Congress as sufficient, for in 1873 a law was enacted which now constitutes Section 3548 of the Revised Statutes of the United States, and reads: "For the purpose of securing a due conformity in weight of the coins of the United States, the brass troy pound procured by the Minister of the United States at London, in the year 1827, for the use of the Mint, and now in the custody of the Mint at Philadelphia, shall be the standard troy pound of the Mint of the United States, conformably to which the coinage thereof shall be regulated." But the Statutes do not say how that Mint pound shall be subdivided, or fix the value of the ounce or of the grain in any manner; nor do they tell us what is meant by a yard, foot, inch, bushel, gallon, quart, pint, or other denomination of measure, although the laws relating to imposts, postage, and other matters name several of these units. If Congress imposes a duty of so much per yard or per gallon, should it not also state what constitutes a yard or what the gallon is? Or is English law, tradition, or usage to decide? Since Congress did not regard the action of the Treasury Department as final in regard to the adoption of the standard troy pound, it cannot regard the action of that department final as to the adoption of the other provisional standards; and we learn about our denominations of weight and measure and their values, subdivisions, and multiples, not from our laws, but from our schoolmasters.

The British troy pound is by British law divided into 5,760 equal parts called grains; it is, therefore, *assumed* that our troy pound is equally subdivided.

Should this brass weight which is denominated "the standard troy pound of the Mint of the United States," be injured or lost, it is to be presumed that the Minister of the United States at London will be instructed once more to obtain a copy of the English standard troy pound by the courtesy of the government of Great Britain, in order that the American people may be enabled to resume the proper regulation of its coinage. It may happen, however, that we will never again be able to obtain a copy of the English standard troy pound, for the British nation is preparing to get rid of it. The British Standards Commission has recommended that troy weight be abolished, and it will undoubtedly be done, for Great Britain now has two kinds of weights, while it has but one kind of long measure and one kind of measure of capacity.

In the absence of the adoption by Congress of a complete and consistent code of laws establishing the necessary denominations and standards of weight and measure, the respective States and Territories have legislated more or less freely on the subject, and thereby added to the confusion. It has been decided that "the constitutional provision giving Congress the power 'to fix the standards of weights and measures' does not extinguish the right of the State over the same subject *until Congress shall have exercised the power conferred*" (Brightly's Purdon's Digest of the Statutes of Pennsylvania).

The following examples are sufficient to illustrate the degree of care and intelligence with which such laws have been passed:

The Revised Code of Maryland (art. xxxii.) says: "The standards for weights and measures of this State, except as otherwise provided in this article, *shall be such as are used at the custom house in the city of Baltimore.*"

The statutes of Alabama (sec. 1217) say: "There is but one standard of measure of length and surface, one of weight, and one of capacity, throughout this State, which must be in conformity with the standard of measure of length, surface, weight, and capacity *established by Congress*"; but Congress has never established any standard except the Mint pound.

The penal code of Arizona (sec. 862) says: "A false weight or measure is one which does not conform to the standard established by the laws of the United States of America"; but the laws of the United States of America are silent on the subject.

The same code of Arizona says further: "In all sales of articles which are sold in commerce by avoirdupois weight, the seller must give the purchaser full weight *at the rate of sixteen ounces to the pound.*" This is the only place in which the laws of Arizona intimate that there ought to be at least sixteen ounces in one pound avoirdupois; but it has nothing to say which affords any clue as to what constitutes either the pound or the ounce.

The great State of New York passed a law in 1829* which forcibly illustrates what evils are possible while Congress neglects to exercise its constitutional power. The first four sections of this law are as follows:

"Sec. 1. The unit or standard of measures of capacity, as well for liquids as for dry commodities not measured by heaped measures, from which all other measures of capacity shall be derived and ascertained, shall be *the gallon.*"

"Sec. 2. *There shall continue to be two kinds of gallons,*" etc.

Section 3 creates and establishes a liquid gallon, the capacity of which is the volume of 8 pounds of water at its maximum density; and Sec. 4 creates a dry gallon of such capacity as to contain 10 pounds of water at maximum density. Both of these gallons differ from any other gallon ever used in any other part of the world. It is highly improbable that either of these gallons was really ever used in New York; but upon this subject I have no information.

That law remained in force (on paper!) until 1851. In that year the State of New York adopted "the standards of weights and measures furnished by the United States." Nearly all the States have done likewise. But several of the States have described in their laws, as among the standards thus adopted, a wine gallon measure of "231 cubic inches" and a half-bushel measure of "1,075.21 cubic inches." The actual standard measures received and adopted were of course in conformity with the Hassler standards, according to which a gallon is the volume of 8.3389 pounds, and the bushel the volume of 77.6274 pounds of water. Even if it were wholly true (and it is believed by experts *not* to be strictly true) that 8.3389 pounds of water measure 231 cubic inches, and 77.6274 pounds 2,150.42 cubic inches, it will hardly do to try to regulate the specific weight of water by law. To regulate the capacity of the gallon by weight is practicable; it is also practicable to fix it by cubic measure; but certainly not by both methods simultaneously. It may as well be legislated that man's work *shall* be infallible.

There is one "standard measure of capacity" in general use in the United States, which has been regulated (?) by law in the several States and Territories in such a

* This law is published in the R. S. of N. Y., 1839, with this note: "Most, and probably the whole, of it was superseded by L. 1851, ch. 184; but as some doubts may arise as to how much of it is in force, it is inserted here."

fashion that it is an open question whether it should not be regarded as a denomination of weight rather than of volume. I refer to the much-abused bushel. We have already referred to the fact that the Treasury Department regards the bushel as the volume of 77.6 pounds of water, while several of the States declare that it is 2,150.42 cubic inches. But the same States, and, in fact, nearly all States and Territories, have further passed laws fixing the contents of the bushel by weight of certain commodities, and their standards differ widely. A bushel of apples in Maine is 44 pounds, but in Wisconsin 57 pounds; a bushel of barley in Louisiana is 32 pounds, but California law makes it 50 pounds; a bushel of buckwheat is 40 pounds in Dakota, but it takes 56 pounds of it to make a Kentucky bushel; a bushel of clover seed varies in different parts of the country from 45 to 64 pounds, oats from 26 to 36 pounds, rye from 32 to 56 pounds, potatoes from 50 to 60 pounds, and salt from 50 to 80 pounds. In Indiana a bushel of coal means 80 pounds if the coal be mined within the State, but only 70 pounds if mined elsewhere. No further proof would seem to be needed that these commodities should never be sold by the bushel, but always by the pound.

Several State laws also refer to "heaped measures," which for obvious reasons should be entirely discarded.

So great is the confusion concerning the weights and measures in use among us that such a book as Webster's Unabridged Dictionary still informs us that New York has a bushel of the capacity of 80 pounds of water, and that a pint in medicine is 12 ounces, although no such medicinal pint exists, while the two medicinal pints which do exist in England and the United States, being in daily use, each containing 16 ounces (though not ounces of the same kind), are not mentioned in the book.

Now let us see what weights and measures are used in other countries.

Great Britain uses a disjointed system almost as bad as ours, but all its denominations and standards are at least fixed by law. Russia also has weights and measures of its own unlike those of any other country. *All the rest of the civilized world uses the metric system exclusively.*

But, although the metric system is not compulsory in Great Britain and the United States, it is permitted by special enactments in both countries.

By act of Congress approved July 28th, 1866, it was declared "lawful throughout the United States of America to employ the weights and measures of the metric system" (R. S., sec. 3569). The same law (R. S., sec. 3570) undertakes to fix the values of the respective metric units, which are well understood throughout the civilized world, by stating their equivalents in terms of the weights and measures in common use, which are *not* understood. The whole world knows what a liter is, but nobody knows, except by tradition and usage, what an American quart is, dry or liquid. Yet American law fixes the value of the liter by declaring it to be 0.908 dry quart or 1.0567 liquid quarts. It would have been more to the purpose to fix the value of each quart in terms of the liter.

On the day preceding the date of the executive approval of the permissive act of July 28th, 1866, Congress passed a joint resolution requiring the Secretary of the Treasury to furnish each State of the United States "one set of the standard weights and measures of the metric system for the use of the States, respectively." As Congress did not provide for any material standards of the metric system to be used as types, I presume that the necessary copies of the French meter and kilogramme were procured from Paris through our State Department. All our States are probably by this time provided with the requisite standard weights and measures of the metric system.

Under section 3880 of the Revised Statutes, the Postmaster-General is required to "furnish to the post offices of the United States exchanging mails with foreign countries, and to such other offices as he may deem expedient, postal balances denominated in grammes of the metric system, 15 Gm. of which shall be the equivalent, for postal purposes, of $\frac{1}{4}$ oz. avoirdupois, and so on in progression."

During the Forty-fifth and Forty-sixth Congresses, the Committee on Coinage, Weights, and Measures of the House of Representatives gave the question of the introduction of a national system renewed attention. Reports were called for as usual, and as usual without any practical result. Many purely imaginary and some real difficulties were urged against a change—not against the metric system, but against *change*. One of these reports gravely asserts that "detrimental confusion" would result from the adoption of the metric system, particularly in the commercial relations of this country "with Great Britain and other countries where the system of weights and measures is the same as that of the United States." But the avoirdupois weight and the measures of length are the only weights and measures in use in both countries; their measures of capacity are not the same; and no other country uses any of the weights or measures of either England or America. The United States took part in the formation of the International Bureau of Weights and Measures established by the International Metric Convention held at Paris May 20th, 1875. The object of that Bureau is to facilitate the universal adoption

of the metric system, and to furnish, compare, and verify prototypes of the metric standards and copies of the same. Among the countries which co-operate and contribute to the maintenance of this Bureau are Germany, Austria-Hungary, Belgium, the Argentine Republic, Denmark, Spain, the United States of America, France, Italy, Peru, Portugal, Russia, Sweden and Norway, Switzerland, Turkey, and Venezuela. Thus of the three civilized countries not yet using the metric system to the exclusion of all other weights and measures, two are members of the International Metric Bureau, Great Britain alone being not represented.

But in Great Britain, too, there has been and is a strong movement toward the ultimate adoption of the metric system. On the 8th day of April, 1862, the House of Commons appointed a select committee to consider the practicability of introducing "a simple and uniform system of weights and measures, with a view not only to the benefit of the internal trade, but to facilitate trade and intercourse with foreign countries." That committee unanimously recommended the introduction of the metric system, bringing in a bill on the 13th of May, 1863, which provided that the exclusive use of that system be made compulsory after three years. The bill passed the House of Commons by a large majority vote, but was never acted upon by the House of Lords. A year later another bill passed both houses of Parliament rendering the use of the metric system permissive, but not compulsory.

The fact that the world has a decimal arithmetical notation renders the ultimate adoption of decimal weights, measures, and money inevitable. The only countries that do not now have decimal weights and measures are those which have not yet adopted the metric system. The United States, Great Britain, and Russia must make a change in order to secure the advantages of weights and measures in harmony with our arithmetic. The reason they have not already adopted the metric system used in all other civilized countries is not that any other existing system is better, or even as good, but that they are unwilling to make any change because of the temporary trouble it necessarily involves. Endless trouble and confusion have always been predicted as the unavoidable results of change; these difficulties are imaginary. Why did not these prophetic disasters follow the adoption of the metric system in Germany, Austria, and all the other countries which have long ago introduced the metric system to take the place of the weights and measures they previously used? That no change can be made without some effort and temporary inconvenience is undeniable; but if we do not sow, neither shall we reap. The benefits of the change will appear far more rapidly now than they came to France and even to Germany. They were willing to make a sacrifice for the benefit of future generations. Are the United States, Great Britain, and Russia struggling against fate in the hope that the effort and inconvenience might fall on our children as well as ourselves, on the principle that as posterity can do nothing for us, neither should we do anything for posterity? If so, they are short-sighted as well as selfish. The generation that adopts the metric system now will live to enjoy its benefits.

A perfect system of weights and measures, worthy to be universal, must not only be decimal, but must also be characterized by the simplest possible relations between its denominations of length, capacity, and weight, respectively. The units of measures of capacity must bear a simple relation to the units of length on the one hand and the units of weight on the other. This correlation of the units is one of the great merits of the metric system, and no other decimal system that might be devised would equal the metric system unless it had equally correlative units. Other decimal systems have been actually introduced from time to time in several countries, only to be abolished again in favor of the metric system. This correlation of the units is a highly important point, which scientific men all understand, but which is generally ignored by a great majority of those who argue against the adoption of the metric system to take the place of the old. If we are ready, then, to acknowledge the immense value of a universal system of weights and measures, we must also admit that only a perfect system will ever be universally adopted. The world would never adopt the weights and measures of Russia, nor those of Great Britain, nor still less the alleged weights and measures of the United States. The peoples who have already adopted the metric system number over five hundred millions, while the three nations which have not adopted it number less than half that population; and two of these countries, with over one hundred million people, have made the metric system permissive, while the third has committed itself in favor of the ultimate adoption of that system by co-operating in the establishment of the International Bureau of Weights and Measures.

The metric system is actually employed in the United States by the Marine Hospital Service, the Coast and Geodetic Survey, the medical department of the navy and other scientific bureaus of the government, and by scientific men generally. The American Association for the Advancement of Science has persistently labored for its general introduction, memorializing Congress more

than once in favor of its adoption. The American Medical Association, the American Association of Architects, the Association of Civil and Mining Engineers, the Association of Master Mechanics, the Pharmacopoeial Convention of the United States, and the American Pharmaceutical Association—all have placed themselves on record as advocating the adoption of the metric system. The Pharmacopoeial Convention which met at Washington last May, consisting of delegates from the medical and pharmaceutical colleges and societies in all parts of our country, unanimously ordered that the weights and measures hereafter used in the Pharmacopoeia of the United States shall be those of the metric system, and no other.

No difficulty whatever will be experienced by any person of ordinary intelligence in learning to use the metric system, if he will.

I have taught a thousand pharmaceutical students to use it, and have never met with one student who could not readily learn it.

The use of the metric system for all purposes may not be adopted as easily as it is adopted in chemistry, pharmacy, and medicine, but it is nevertheless irresistible. The only serious difficulty which arises from a change of system seems to be that attendant upon changes in land measurements. If it be deemed best, the old land measures upon which the public surveys are based and by which the titles and conveyances of lands and lots are defined can be left untouched until such titles and conveyances shall cease to exist.

It is in commerce and industry and in science that a universal decimal system is especially valuable. Lands and lots are permanent and immovable, ownership in them is traced through generations, they are not frequently transferred, and smaller lots are seldom divided. But there is no permanent private ownership in anything else that can be measured. All other kinds of property, as machinery and all movable commodities, are produced and distributed and are perishable. In all computations attendant upon foreign, interstate, and local trade and transportation, a universal decimal system would indeed be a "universal blessing."

Suppose the merchant who sells cloth should be suddenly deprived of his yard stick and given a meter stick instead. He would simply have to use the meter stick, sell the meter at one-ninth more than the selling price of the yard, and order all his cloth by the meter instead of by the yard thereafter. His customers might for a generation continue to ask for cloth by the yard; but the new yard would be quite as convenient to them as the old.

If the grocer should be obliged to exchange his quart measure for the liter, he would find the liter measure quite as handy, and would only have to charge 6 per cent more for the new quart. In the same way would he find that it is not more difficult to weigh sugar with metric weights than with avoirdupois weights, and if his customer calls for a pound of sugar it would not occasion any difficulty were he to sell $\frac{1}{2}$ Kgm. instead, charging 10 per cent more for it than he formerly charged for the pound. After a very brief time, the merchants would hardly be conscious of the fact that any change had taken place.

In 1881 I visited my native country. The metric system had then been the only legal system of weights and measures for years. No other weights and measures were permitted. Yet one of my first experiences on that visit was to hear a dealer speak of quarts instead of liters in referring to a delivery of milk. When I expressed surprise, saying that I supposed the metric system to be the only one used, the reply was that the liter was meant when the Swedish name for the quart was used, and that the liter measure was the only quart measure in existence. But as names do not constitute the metric system, it makes little difference whether the meter be called a meter or a yard, whether the liter be termed a liter or a quart.

In some countries it was deemed necessary or useful to prepare the way for the adoption of the metric system by the temporary use of compromise systems. This was done in several German countries, Sweden, Switzerland, etc.

In Switzerland a new foot was adopted which was exactly 0.3 meter. The Ordnance Board of the United States recommended (1877) the adoption of the same foot in our country. This would have given us a metric yard of 9 decimeters, which would be only about half an inch shorter than the English yard; a multiplication by $\frac{1}{3}$ would convert yards into meters, and a multiplication by $\frac{3}{2}$ would convert meters into yards. A cube upon $\frac{1}{3}$ of that new yard (4 new inches), or 64 new cubic inches, would then correspond exactly with the liter, and might be called the new quart. If then the weight of 1 new pint (or $\frac{1}{2}$ liter), which would be exactly 500 Gm., should be called the new pound, the new cubic inch of water would weigh exactly $\frac{1}{4}$ new ounce, and the new ounce would be about 10 per cent larger than the avoirdupois ounce, or almost the exact equivalent of the troy ounce. But this would after all only give our weights and measures a simple relation to the units of the metric system,

and establish simple relations between our measures of length, capacity, and weight, without giving us decimal subdivisions, which are necessary to bring our weights and measures into harmony with the universal system of arithmetical notation.

If any sort of compromise is to be tolerated at all, let it be simply the permissive use of the names of the old units to designate the new, to a limited extent.

The International Metric Bureau has supplied the United States with copies of the new international prototypes of the meter and kilogramme. These copies are made of iridio-platinum. The meter is regarded as an absolutely accurate copy of the "Meter of the Archives" at 0° C. The kilogramme weight sent us (No. 20) is copied from the "Kilogramme of the Archives," and has an ascertained correction of -0.039 Mgm.

It is conceded and evident that whenever Congress does take some action to provide our nation with proper laws and consistent standards of weights and measures, the old customary weights and measures will not and cannot be retained. The ultimate adoption of the metric system seems inevitable. We have now no legalized standards and denominations at all, unless sections 3569 and 3570 R. S. are to be construed as making the metric weights and measures our only legalized system.

This then is the opportune time to take another and decisive step. It would be in the greatest degree desirable to declare by law the newly arrived copy of the Meter of the Archives to be the only and absolute basis and prototype standard of the United States for all weights and measures hereafter to be used in our country. The meter defined by this iridio-platinum bar should be declared to be the meter of the United States. Provision should be made for its preservation, and a sufficient number of accurate copies should also be provided as working standards for use in comparing and verifying the standard weights and measures furnished the States respectively.

The metric system could now be adopted by law to take effect in 1892 or 1893, in commemoration of the quadricentennial of the discovery of the American continent, to be used at least in all governmental transactions and in foreign and interstate commerce and transportation.

May we not reasonably expect Congress now to put an end to the present chaotic condition of things, and to place this nation on the same footing with Germany, France, Central and South America, and the rest of the metric world?

I believe that this nation has it in its power to decide now upon the immediate establishment of the metric system throughout the world; for if this country should set the date for its adoption by our people in relation to imports and exports, the postal service, interstate transportation, etc., Great Britain and Russia must soon follow the example.

The recent sitting of the Pan-American Congress at Washington, and the results which it is hoped may ultimately grow out of its deliberations, should remind Congress that the countries represented in that conference have long since and irrevocably adopted the metric system.

Surely Congress will not permit this grand opportunity to pass. Let it now effectually co-operate with the rest of the civilized world "to the final and universal establishment of the metric system," and at the same time fulfil its constitutional obligation to provide for the people of the United States a code of complete, specific, and consistent laws establishing "fixed standards of weight and measure"—an obligation imposed a century ago.

It would, indeed, "be worthy the dignity of the Congress of the United States" to celebrate the four hundredth anniversary of the discovery of America by conferring upon mankind now, so far as it can, the "universal blessing" referred to by John Quincy Adams.

ILLINOIS COLLEGE OF PHARMACY, CHICAGO.

Rate of Decomposition of Chlorine Water by Light.

—By studying the action of diffused daylight and sunlight on chlorine water by means of the voltaic balance, the author finds that the decomposition at first takes place with moderate uniformity and gradually diminishing decrease of voltaic energy. At the minimum, the liquid contains only hydrochloric, hypochlorous, and chloric acids. On further exposure the voltaic energy increases slowly until the solution contains only hydrochloric acid and hydrogen peroxide. Thus there are here two essentially different periods of chemical change—first, the period of the formation of oxygen acids of chlorine, and, second, the period of the decomposition of these acids into hydrochloric acid and hydrogen peroxide.—G. GORE in *Proc. Roy. Soc. and J. Chem. Soc.*

Simple and Rapid Preparation of Pure Gases.—Instead of using an acid for the evolution of carbonic anhydride, sulphurous anhydride, and similar gases, it is convenient to use sodium hydrogen sulphate or sodium bisulphate.

A mixture of equivalent quantities of the respective salts in powder gives, when wetted with water, a regular stream of the required gas, which will be free from the impurities usually derived from the use of an acid.—H. BORNTRAEGER in *Zeit. anal. Chem. and J. Chem. Soc.*

Pseudotsuga Douglasii, Carriere, as a Substitute for Quercus Suber.*

BY A. O. INGALLS.

ABOUT five years ago my attention was directed to the bark of the *Pseudotsuga Douglasii* as a possible substitute for the *Quercus Suber*, and under the impression that it might possess a future commercial importance. While the results which I have obtained are not satisfactory in a commercial sense, yet they are such that, in the hands of those more able to surmount the difficulties, it may become a good substitute for the cork of commerce. This article is written, therefore, more for the purpose of calling attention to its possibilities than otherwise.

The writer submitted specimens of the bark to several cork manufacturers for the purpose of obtaining an expression of opinion regarding its commercial value, which generally was favorable under conditions of supply. At that time it was impossible to supply any large quantity of bark of good quality, and there the question rested.

The question then arose regarding the cultivation of the tree in a manner similar to that of the cork oak of Europe. Having collected from private and government sources all the literature relating to the cork industry that I could obtain, the writer then submitted the tree to experimentation covering a period of nearly four years, which probably is too short to determine fully the questions involved, but the result thus far is an improvement in the yield and quality of the bark—of which I submit samples of the bark under normal conditions of growth, and of that under a pseudo-cultivation. It will be seen that the tree, under favorable conditions, is susceptible of improvement, but my results do not show that it is yet in a condition to be utilized as a commercial product, or as an economical substitute for the cork of commerce.

The difficulty which has seemed insurmountable has been to prevent the fissuring of the bark, the cause of which is probably to a certain extent climatic, for observation has shown that where the trees are sheltered in such a manner as to reduce the force of the climatic causes, the disposition of the corky layer is more regular and the fissures not so deep, and even exposed surfaces of the same tree show more and deeper fissures than that of the opposite side. Treatment of the tree in a manner similar to that employed in the cork forests also diminishes the frequency and depth of the fissures.

The *Pseudotsuga Douglasii* has some advantage over the *Quercus Suber* in this, that the corky layers are formed earlier and on younger trees, and a good sample is but little inferior to that of commercial cork, therefore it has this financial proposition in its favor.

To those who may be interested in this subject I will be pleased to impart such information as I can, in the hope that its possibilities may be tested.

MURRAY, IDAHO, August, 1890.

On the Emetine Valuation of Fluid Extract of Ipecac.†

BY WILLIAM SIMONSON.

THE pharmacy of ipecac, as contained in the pharmacopœia, is extremely simple, requiring only the preparation, direct from the drug, of a fluid extract from which are made the syrup and wine and the tincture of ipecac and opium. Whatever is to be gained in having these galenicals of constant emetine strength may be most readily reached, therefore, by subjecting to an emetine valuation the aqueous solution obtained in making the fluid extract.

In the official method of obtaining this aqueous ipecac solution, the fat, wax, and other ether-soluble constituents of the drug, as extracted by alcohol, are very largely removed and left upon the filter, about 10 or not more than 15 per cent remaining in solution. Of the total ether-soluble substances obtainable from the aqueous ipecac liquid, when first rendered acid and then alkaline, 4 to 5 per cent will come from the acid fluid, and 96 to 95 per cent from the same fluid after being made alkaline.

The residue from the first extraction will contain scarcely more than a trace of alkaloid, while that from the second will consist of emetine of a quality to be described further on. Being in relatively small proportion, the non-alkaloidal substances may be removed almost perfectly by ether from the acid solution, leaving nothing but emetine to be extracted when the liquid is made alkaline.

Five C.c. of the aqueous solution (= 6 Gm. ipecac) were washed, in succession, with 4 portions of ether, 25 C.c. each, and the ether solutions washed first with 10 C.c. acidulated water and then with 10 C.c. water. On evaporation the residues weighed: 1st, 0.0027; 2d, 0.0017; 3d, 0.0004; 4th, 0.0000.

Other measures of the solution, 5 C.c. each, cleaned by ether, when made alkaline by ammonia and extracted with fresh ether, yielded the following quantities of alkaloid residue:

VOLUME OF Aq. SOL.	VOL. ETHER	ALKALOID.	
		Frac-tions	Total
40 C.c.....	50 C.c.		
	40 "		
	30 "		0.0005
30 C.c.....	80 "	0.0054	
	80 "	0.0049	
	80 "	0.0007	
25 C.c.....	80 "	0.0000	0.0070
	80 "	0.0065	
	25 "	0.0010	
20 C.c.....	20 "	0.0008	
	20 "	0.0000	0.0078
	25 "	0.0088	
17 C.c.....	25 "	0.0118	
	20 "	0.0080	0.0079
	15 "	0.0000	
	25 "	0.0012	
	20 "	0.0047	
	20 "	0.0018	
	15 "	0.0004	0.0076

In this solution the alkaloid is twenty times as great in amount as the non-alkaloidal substances, and this ratio has been closely maintained in all specimens of the drug that have been worked by these hands.

As the emetine residues from equal volumes of the solution are moderately uniform, the error of measuring being about 1 per cent of volume used, the method would appear trustworthy, and is given here in detail as sufficiently meeting the requirements of an assay process.

Assay of Aqueous Solution of Alcoholic Extract of Ipecac.

Take of the Aqueous Solution 2.50 C.c.,
or sufficient to represent about 5 Gm. Ipecac.
Water,
Stronger Ether,
Water of Ammonia, 10 per cent,
Dilute Sulphuric Acid, 10 per cent.... each a sufficient quantity.

To the solution, contained in a stoppered bottle, capacity 30 to 35 C.c., add 5 C.c. of dilute sulphuric acid and 20 C.c. ether, shake them well together for five minutes, and place aside until they have almost completely separated. Pour off the ether as closely as possible into a separatory funnel of 125 C.c. capacity, add to the bottle 20 C.c. of ether, shake, and pour off as before, repeating the washings a third and fourth time. Transfer the aqueous solution to a separatory funnel, capacity about 60 C.c. To the ether washings add 5 C.c. of water and 3 C.c. of dilute sulphuric acid, shake well together, allow to separate, and draw off the lower aqueous layer, using it to rinse the bottle, before adding to the contents of the second separator.

To the second separator add 25 C.c. of ether and 1 C.c. of water of ammonia, or sufficient to make the mixture strongly alkaline. Immediately shake the liquids together, but not violently, for about five minutes, or until the aqueous layer becomes perfectly clear, and place aside in a cool place until separation is nearly complete. Draw off the lower layer into the first separator (the ether washings having been poured out) and add to it 20 C.c. of ether. Shake the liquids together during five minutes, allow to separate, and run the aqueous solution into a third separator. To this add 15 C.c. ether, again shake together, and when separated draw out the aqueous liquid, and place it aside as sufficiently extracted. Pass in succession through the second, first, and third separators (shaking well after each addition and transfer) distilled water rendered faintly alkaline with ammonia, using 5 C.c. for each washing, until the last portion comes off colorless, about four being necessary. Decant the ether solution from the second separator into a tared beaker or dish, capacity about 75 C.c., taking care that no drop of water passes in with it. Pour the ether of the first separator into the second, rinse around well, and decant into the tared dish. Pass the ether contained in the third separator through the first and second and add to the contents of the dish. Evaporate the solvent in a current of warm air or on a water bath at 30° C., and dry the residue over sulphuric acid during twelve hours. The weight, less tare of the dish, is the amount of emetine obtainable from the volume of ipecac solution submitted to the assay.

While four washings with ether by decantation will still leave in the alkaloid solution a quantity of ether-soluble matter which is not emetine, the amount is so small that it may be neglected. In one careful trial, in which the alkaloid was freed from this impurity by shaking back again from ether to aqueous solution and then into a second ether solution, the yield of alkaloid was exactly the same as obtained by the assay process, while the residues were estimated to contain respectively 99.4 and 98.6 per cent of pure emetine.

Two extractions of the ether washings with 5 C.c. each of acidulated water are ample. In a series in which they were tested, a third washing gave a turbidity but not a precipitate with an excess of potassium-mercuric iodide, a very sensitive reagent for emetine.

The volume of solution, as prepared for precipitation,

* Paper presented at the annual meeting of the Amer. Pharm. Association at Old Point Comfort.
† Paper read at the annual meeting of the Amer. Pharm. Assoc. at Old Point Comfort.

should be about 15 to 18 C.c. If it is much more, a small part of the alkaloid will fail of extraction, unless a fourth portion of ether be used; while if it is less than 15 C.c., a substance other than emetine, thrown out with it, will assume in many cases, though not in all, a coherent extractive-like condition, and prevent the ether from taking up all the alkaloid. In one trial, in which precipitation of the undiluted aqueous solution was attempted (5 C.c. representing about 7 Gm. of ipecac), the emetine obtained was but 70 per cent of that known to be present. If the solution be diluted until 3.5 to 4 parts equal 1 part of ipecac, the non-alkaloidal substance will go out in a finely divided, rarely coherent state, and the alkaloid can be separated from it completely by the shaking with ether.

In making the precipitation the volume of ether ordered should be added first, in order that the two liquids may be shaken together the instant that the alkaloid passes from aqueous solution. This shaking should be rather a rolling of the fluids together, as by a circular horizontal motion; and should never be a violent churning, as in that way an obstinate emulsion may be formed. At best, emulsifying will occur to some extent, but the alkaline washing water, when well shaken with the intimate mixture of ether and extractive solution, will usually cause them to separate completely. The washings with alkaline water should be continued until the last addition comes off quite colorless.

Evaporation of the ether solution is best done in a dish in an air bath at 40° to 50° C. If done on a water bath, the operation involves a constant fanning of the surface of the solution to prevent its creeping over the rim of the dish. When the solvent has nearly vaporized, the dish should be rotated and inclined in such a way as will get the residue in a thin and nearly uniform layer. Without this manipulation the alkaloid will oftener be left in a narrow and thick ring, which will require several times the prescribed twelve hours for drying to nearly constant weight, and will require many days over sulphuric acid before the weight is perfectly constant.

In making weighings no precautions are necessary, as, aside from acquiring a yellow color, the alkaloid, if obtained from well-washed solutions, is permanent in the air, not increasing perceptibly in weight upon ten days' exposure in a moist summer atmosphere.

It is next necessary to determine the purity of the residues weighed as emetine. In twenty residues all but two were perfectly soluble in a dilute acid to a clear fluid, and these two left a film, scarcely weighable, the solutions being quite clear. The method used rests upon the power of the alkaloid to form with acids neutral salts, the quantity of alkaloid in a residue being calculated from the quantity of acid saturated by it. One-fiftieth normal sulphuric acid is the most convenient standard acid solution. A solution of purified litmus coloring is a good indicator (Sutton's "Handbook Vol. Anal.," p. 31 [c]).

As the emetine solutions in the standard acid are always yellowish, the change from acid to alkaline reaction, as the excess of acid is saturated by N_2O soda, is not easily seen, and is best observed by having two solutions equally tinted by litmus.

The beginning of alkalinity is shown by a slight darkening of the fluid and production of a peculiar greenish tint, not to be described, but readily seen by placing alongside the unaltered comparison liquid. With this aid titration will usually be correct to 0.1 C.c., or within 0.2 C.c.

In the manner described seven emetine residues were saturated by standard acid, the quantities being given in the following table:

NUMBER.	Alkaloid.	C.c. $\frac{n}{50}$ Sulphuric Acid.
1.....	0.1146	21.2
2.....	0.1432	27.75
3.....	0.1027	20.10
4.....	0.1405	27.5
5.....	0.0963	18.9
6.....	0.0716	13.9
7.....	0.0715	14.0

On referring to the more accessible sources of information, the following formulæ for emetine are found: Pharmacographia, Flueckiger and Hanbury: Reich, $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 = 378$; Lefort (1869), $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 = 560$. National Dispensary: Lefort & Wurtz (1877), Ann. Ch. and Phys. (5) 12, 277, $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8$. 484. U. S. Dispensary: Glenard, Ann. Ch. and Phys. (5), 8, p. 233, $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 = 248$. Kuntz, Archiv der Pharmacie (3), 25, 461, $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 = 508$. Watt's Dict. Chemistry (1889), observer not named, $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 (?) = 508$.

The quantivalence of the alkaloid is not stated; but, whether monad or dyad, these molecular weights vary so much that no selection is possible. Recently, however, the molecule has been shown by Blunt (Ph. Jour. (3), 20, p. 809) to be dyad.

*To these may be added Dragendorff (Die qual. und quant. Analyse von Pflanzen, etc. [1882], page 57: $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 = 508$.—Ed. AM. DRUGG.

To determine the ratio between an acid and the alkaloid, and, therefore, to approximate the molecular weight sufficiently to make a choice among those given above, the neutral sulphate was made and tested as detailed below:

From an aqueous solution of an alcoholic extract of ipecac, rendered alkaline by sodium carbonate, the alkaloid was taken up by ether; from the ether solution, after washing twice with half a volume of water rendered alkaline by sodium carbonate, it was extracted by 2-per-cent sulphuric acid in excess, and again from the aqueous solution, after repeated washings with ether, by sodium carbonate and ether. The last ether solution, after several washings with water made faintly alkaline by ammonia, yielded the alkaloid as a nearly colorless, amorphous residue. This was dissolved in a very slight excess of 10-per-cent sulphuric acid, the excess exactly saturated by sodium carbonate, and the solution evaporated to dryness at 40° to 50° C. The dry sulphate was next dissolved in hot absolute alcohol, to form a 10-per-cent solution, leaving the small quantity of sodium sulphate, and filtered after cooling.

As emetine salts are amorphous, and have no fixed limit of solubility—evaporated solutions leaving an extractive-like mass—recourse was had to ether, in which the sulphate is as good as insoluble, to separate the small amount of either free emetine or free sulphuric acid possibly present in the alcoholic solution.

Eight volumes of stronger ether (containing about 96 per cent of absolute ether, the remainder being mainly alcohol) were poured carefully over the alcoholic solution and the two liquids mixed by violent shaking. The very voluminous precipitate was washed with ether, once by decantation, using 10 volumes, and, after collecting in a funnel, with about 20 volumes in small portions. Exposed to air, the washed precipitate contracted to a very small bulk, and when sufficiently dry formed a powder which much resembled resin of jalap.

(A) The dry powdered salt was given two emetine estimations, and the alkaloid determined by drying to a constant weight at 100° C. in a current of dry air:

- (1) 0.1186 salt gave 0.0890 emetine = 78.85 per cent.
 (2) 0.1408 " " 0.1108 " = 78.84 "
 (3) 1.0488 " lost 0.0682 at 100° C. = 6.50 "

If calculated to anhydrous salt:

- (1) Emetine 88.78 per cent. (2) Emetine 88.79 per cent.

(B) Salt used in (A), dried during three days over sulphuric acid (the very hygroscopic powder kept in a weighing tube), was given one emetine estimation; water was estimated as before, and sulphuric acid determined in about 0.500 of salt in 100 C.c. of water.

- (1) 0.1008 salt gave 0.0820 emetine = 81.85%.
 (2) 0.5090 " " 0.1910 BaSO_4 = 0.08385 H_2SO_4 = 15.78%.
 (3) 0.5174 " " 0.1930 " = 0.8117 " = 15.68%.
 (4) 1.0118 " lost 0.0812 at 100° C. = 0.808%.

Calculated to anhydrous salt, (1) emetine, 88.98 per cent.

(C) Salt dried at 100° C. in a current of dry air to constant weight. At 120° C. this product lost 0.6 per cent, but became tinted pale reddish, apparently slightly decomposed.

- (1) 0.1450 salt gave 0.1214 emetine = 83.72%.
 (2) 0.5140 " " 0.1979 BaSO_4 = 0.08324 H_2SO_4 = 16.20%.

RELATION OF ACID TO ALKALOID.

(B) (1) Emetine, 81.85 per cent.	(2) H_2SO_4 , 15.78 per cent.
(B) (1) " 81.85 "	(3) " 15.68 "
(C) (1) " 88.72 "	(2) " 16.20 "
15.78 = 81.85 = 98 = 505.8	
15.68 = 81.85 = 98 = 508.4	
16.20 = 88.72 = 98 = 506.5	

These figures point to the formula of Kuntz, $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 = 508$, as being the correct one, and certainly prove that the molecule is dyad, confirming the statement of Blunt, previously cited.

If this formula be accepted, the salt used in the second series of estimations, (B), probably has the following composition: $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 \cdot \text{H}_2\text{SO}_4 \cdot \text{H}_2\text{O} = 624$.

Calculated.	Found.
$\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8$.....81.41 per cent.	81.85 per cent.
H_2SO_4.....15.705 " "	15.78 " " (mean).
H_2O}.....2.885 " "	3.08 " " "
Total.....100.00 " "	100.16 " " "

and that used in the third series (C): $\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8 \cdot \text{H}_2\text{SO}_4 = 606$.

Calculated.	Found.
$\text{C}_{20}\text{H}_{27}\text{N}_3\text{O}_8$.....88.88 per cent.	88.72 per cent.
H_2SO_4.....16.17 " "	16.20 " " "
Total.....100.00 " "	99.92 " " "

Returning now to the weight of the emetine residues and the volumes of N_2O sulphuric acid saturated by them, it will be seen that, with the emetine molecule surely dyad, 1 C.c. of the standard acid neutralizes 0.00508 of al-

kaloid. On this basis the quantity of emetine in each residue is calculated, and the percentage of pure alkaloid found therefrom. As the experimental error is about 0.5 to 1 per cent, the fractions in the last column of the following table should not have too great a value placed upon them:

No.	Alkaloid Residue.	N C.c.—H ₂ SO ₄ 50	Emetine Indicated.	Per Cent in Residue.
1	0.1146	21.2	0.107696	94.0
2	0.1432	27.75	0.14097	98.4
3	0.1027	20.1	0.102108	99.4
4	0.1405	27.5	0.1397	99.4
5	0.0963	18.9	0.096012	99.7
6	0.0716	13.9	0.070612	98.6
7	0.0715	14.0	0.07112	99.4

So far as the quality of the product goes, the assay process stands approved and is apparently trustworthy.

Evidently, instead of weighing the residue, the process may be amended by dissolving the alkaloid in an excess of standard acid, or, if sodium carbonate be used as precipitant, by evaporating the ether solution in presence of an excess of standard acid, in either case the excess being titrated by $N\frac{1}{2}$ alkali. In this way the quantity of pure emetine is obtained at once and there is avoided the tedious drying over sulphuric acid. For assay purposes the drying is sufficiently done at the end of twelve hours, provided the residue is spread evenly in a thin layer, but for accurate analyses it will require fifty hours at least, and often half as much more. However, present experience with the alternative method is not sufficient to recommend it here; and even should it prove equal to the gravimetric process, it will remain subject to the disadvantage that there are many who cannot use it well through inability to distinguish colors sharply.

It remains to acknowledge aid as well as information from papers by the following authors: Cripps & Whitby, *Pharm. Journ.* (3) 19, p. 721; Blunt, *Pharm. Journ.* (3), 20, p. 809.

CINCINNATI, July 27th, 1890.

What Amount of Sand is Present in Commercial Asafetida? *

BY W. A. PUOKNER, CHICAGO.

In approaching this query, which appeared simple and easy, an obstacle was encountered from the absence of authoritative statements in regard to the mineral constituents of the natural substance, and I was also somewhat puzzled over the word sand itself. Webster and Worcester define the word, but not in such a way as to give the analyst any help in the determination of it. The latter states that it is composed of minute grains of stone, or small particles of quartz or other stone not cohering together. In Sachs' "Agricultural Chemistry" it is said to consist of "loose, non-cohering grains of quartz, of quartz and feldspar, or of other minerals."

It occurs to me that a better form of the question would be directed to the proportion of ash—a fact easily determined, and which would afford, after a sufficient number of determinations had been made, a standard of comparison of some value, and which would be easy of application.

In regard to authorities on the mineral constituents of asafetida, Pelletier is quoted in the U. S. D. as finding traces of the acid malate of calcium. Brandes finds 6.2 per cent of calcic sulphate, 3.5 per cent of calcic carbonate, 0.4 per cent of oxide of iron and alumina, and 4.6 per cent of impurities, consisting chiefly of sand and woody fibre. Maisch, *Proc. Amer. Pharm. Association*, 1871, reports 57, 44, 15, 51, and 62 per cent ash, consisting chiefly of $CaSO_4$, in specimens examined by him. Both the German and British pharmacopœias limit the ash to 10 per cent, without defining its composition.

Under these circumstances I thought it best to determine carefully the quantity and quantitative composition of the ash in the specimens at hand, and disregard the query itself; hence the proper title of this communication would probably be "A Note on the Constituents of Asafetida."

The following is the method adopted: A weighed quantity of a representative sample of the drug was dried in an air bath until it could be reduced to a fine powder; the loss of weight was noted, and 2 or 3 Gm., calculated to weight of the original sample, taken for analysis. This was first extracted with alcohol in a Soxhlet extractor, and from the requirement of the U. S. P. that 60 per cent should be soluble in alcohol, the loss under this treatment was noted. As the substance, after extraction, was dried at 100° C. and then weighed, the figures given in this paper give the amount soluble in alcohol plus the water contained in the original sample, as I inferred that the standard of 60 per cent refers to the air-dry sub-

stance. The residue from alcohol extraction was then slowly ignited in a shallow platinum capsule, and this residue designated as ash. The ash obtained was not a fixed quantity, as the organic matter present reduced a portion of the calcic sulphate to the sulphide. The ash was treated with hydrochloric acid and water, the residue again united and weighed as "insoluble ash." In the soluble portion alumina and iron were determined as oxides, calcium was precipitated as oxalate, dried in a Gooch filter at 100° C., and calculated as $CaC_2O_4 \cdot H_2O$, and magnesium determined as pyrophosphate. Carbonic acid was determined by the method of Rose (absorption by caustic alkali). Sulphuric acid was determined by extracting a fresh portion with alcohol, treating residue with dilute hydrochloric acid, evaporating, and treating with HCl and $KClO_4$ to destroy organic matter, then precipitating with baric chloride. The baric sulphate was separated with a Gooch filter, dried at 130° to 140° C., and weighed.

	Soluble in alcohol.	Total ash.	Insoluble ash (earth, clay, sand, etc.).	Alumina and iron.	CaO.	MgO.	SO_3 .	CO_2 .
No. 1 in mass	9.49	19.45	2.32	1.16	7.12	1.14	8.57	1.09
No. 2 in mass	27.89	56.03	1.37	.42	25.07	2.03	20.49	10.78
No. 3 powdered	44.48	88.59	2.36	.68	16.57	1.39	16.18	5.33
No. 4 powdered	33.47	47.86	1.95	.60	18.85	.42	23.51	2.62
No. 5 powdered	31.35	55.38	2.96	2.57	9.91	6.49	8.96	4.25

Silica found—not determined.

Of the two specimens of lump asafetida, No. 1 was dark and irregular, hard and dry portions intermixed with softer parts, while No. 2, bought as of extra quality, was of a lighter color and homogeneous throughout. The former gave 19 per cent while the latter showed 56 per cent of ash, of which about 34 per cent was calcic sulphate and 19 per cent calcic carbonate. Of the specimens of powdered gum, No. 3 was obtained of a Chicago drug house, No. 4, with its 47 per cent of ash containing 40 per cent calcic sulphate, was purchased of a New York jobber, while No. 5, containing 55 per cent of ash, bore the label of a drug miller claiming it to be a purified gum.

CHICAGO COLLEGE OF PHARMACY.

Albuminate of Iron and its Preparations.*

BY DR. ADOLPH TSHEPPE.

ALBUMINATE of iron was introduced as far back as 1877, by Dr. Friese, and has been the object of investigation and discussion by a number of able writers at home. But altogether such flagrant discrepancies are still existing between formulæ, constitutions, and appellations of these preparations that the subject to-day is far from being exhausted or the question settled, and the old quarrels might be renewed on the slightest provocation.

In this country, to my knowledge, so far, they have received no serious attention, and I hope, by introducing this theme to this body, to promote acquaintance with the subject, and, by experiences gained in its study, to help to diffuse the knowledge so that further investigation and discussion may be invited.

It is a good many years now since it has been discovered that some organic acids, like the citric and tartaric, prevent the precipitation of ferric hydrate by potassa; and that this property is not confined to bodies of a decided acid nature, but is also shared by some indifferent bodies, like sugar, has been known long enough to have a formula for soluble saccharate of iron introduced in the first edition of the German Pharmacopœia. This preparation, according to the official formula, is obtained by a rather devious route, which may be greatly simplified; but other analogous substances, like dextrin, gum arabic, glycerin, albumen and its derivatives and congeners, do not show such difficulties as sugar, and the working of the chemical transformation with them is more translucent. Solutions of these bodies in mixture with ferric salts give on neutralization a precipitate which constitutes a chemical combination of the substance employed with iron; a further addition of alkali redissolves the precipitate, the alkali now entering into the combination.

Before solution in alkali, the precipitate may be freed of the by-products of the chemical exchange by straining and washing with water, before the addition of the alkali, in order to obtain the final product in a state of purity. The same may be attained by subjecting the alkaline solution to dialysis.

The precipitate, except in the case of albumen, is also soluble in diluted acids, but this solution only represents again the original mixture.

In place of the normal ferric salts, basic ferric salts may be employed, which behave the same as the normal; only

* Abstract of a paper read at the meeting of the American Pharmaceutical Association at Old Point Comfort, Va.

The author's paper contains some important facts regarding the nature, properties, and reactions of albumen and peptone. In order to facilitate reference to this portion of the paper, we have made it a separate article, with the title "Notes on Albumen and Peptone," for which we have the author's consent.—ED. AM. DRUGG.

* Paper presented at the annual meeting of the Amer. Pharm. Association, September, 1890.

as it is the acid of the ferric salt which is replaced by the substance used, the new compound will contain a larger amount of iron than those obtained from the normal salts.

These basic iron combinations seem to be even more stable than the normal combinations, and are produced generally when an appropriate substance, being a crystalloid, is mixed with normal ferric chloride, and potassa gradually introduced. By this slow manner all the iron is first transformed into basic ferric chloride before the combination with the substance is effected; glycerin and sugar form typical examples of this behavior, and the modus operandi of the preparation of the saccharate of iron adopted by the German Pharmacopœia clearly points to the fact that a basic saccharate is either aimed at or unintentionally obtained.

Colloids like albumen, dextrin, or gum acacia prevent the formation of a basic iron salt. The albuminate is directly precipitated on addition of alkali to saturation of the acid, showing that a combination is formed having the constitution corresponding to the normal ferric salts.

But if in the case of crystalloids the manner of addition be reversed, adding the iron mixture to an excess of alkali, a solution corresponding to the constitution of the normal salt is also obtained.

This procedure is not admissible in all cases, as iron hydrate may be precipitated in place of the expected compound. But the normal form may also be obtained from the alkaline solution, prepared as before, by precipitation by acids or more certainly by dialysis.

The passage of the normal to the basic salt may be judged by the change of color of the solution, which passes from that of pale sherry to that of old port.

The percentage of iron in these compounds is obviously not constant. For albuminates the amount of iron oxide obtained by calcination of the dried precipitate of the albuminate varies from $\frac{1}{3}$ to $\frac{1}{2}$ and all the intermediate fractions, according as the normal or basic chloride or mixtures of both be employed.

But it may vary still more. Alkaline solutions may contain a large excess of albumen, acid mixtures an equally large excess of basic iron. The excess of albumen is not eliminated by precipitation, as is the case with sugar or glycerin, because it is changed in this process into a derivative, which is itself precipitable.

For a specific solution of a ferric salt, the variation of percentage of iron in the compound is a small one, and the proportion in which an appropriate substance combines with the iron of this specific solution may be satisfactorily ascertained.

This determination is effected by gradually adding to a measured volume of a 1-per-cent solution of the substance to be tested, measured volumes of an equally diluted solution of ferric chloride, adding after each trial sufficient surplus of caustic alkali. Between the additions a sample is withdrawn for test. The limit of addition is reached when ferric hydrate is precipitated, then the proportions of the volumes of the two solutions indicate the ratio in which the substance in hand combines with ferric chloride.

One part by weight of the following named substances was found to combine with the following parts of solution of ferric chloride, U. S. P.:

Glycerin.....	0.92
Cane Sugar ..	0.42
Mannite	1.72
Egg Albumen.....	1.05

The proportion of basic chloride of iron (i.e., dialyzed iron) in solution of usual strength (5 per cent of Fe_2O_3) was $7\frac{1}{2}$ to $8\frac{1}{2}$ parts by volume to 1 of albumen.

The conditions to form this soluble iron compound depend as well on the chemical constitution of iron salts as on that of the organic substance. For iron it is required that the salt be a ferric compound, and that the iron be precipitable by alkali in the state of hydrate, and that the combination be effected while the ferric hydrate is in the nascent state.

Therefore, *the organic compound must be present before*, and, contrary to statements, I never found already precipitated hydrate of iron to dissolve in sugar or any other indifferent substance. As ferric salts, the chloride, sulphate, or nitrate may be employed, the phosphate or the alkali combinations of organic acids with iron being excluded.

Most of the reactions named belong in common to albumen, and all the other indifferent bodies mentioned. But with albumen the reaction becomes more complicated through reaction belonging to albumen itself.

If alkali be added to an albuminous precipitate for the purpose of solution, a proportion of alkali insufficient for solution of the whole does not dissolve a proportionate part of it, as might be expected from experience with inorganic bodies. The coagulum swells up, becomes a jelly, and finally dissolves to a perfect solution only when the adequate amount of alkali required for its solution has been added. If alkali be added in the same manner to a precipitate of ferric albuminate, the addition of an insufficient amount may have the disastrous effect of decomposing the compound by extracting albumen;

so that when finally the full amount of alkali has been added the compound is so decomposed that albumen only goes into solution, leaving the iron behind as ferric hydrate. Quantities of material, and much labor, may be wasted by ignorance or non-observance of this rule.

Not only albumen, but also the other substances mentioned, are subject more or less to this conformity, each showing an individualism demanding a modification of the general treatment outlined. The existence of such individual characteristics may be illustrated by treating mixtures of sugar or glycerin and ferric chloride with alkali in different modalities.

From a solution of cane sugar and iron no precipitate is obtained if a surplus of potash be added at once; the solution contains the soluble saccharate of iron and potassium; but if the same amount of potash be added in drops, as is done if dropped from a burette, ferric hydrate is precipitated and no soluble compound is formed. The same casualty does not occur with glycerin. With iron a soluble compound is formed if the solution of iron chloride be dropped into a mixture of alkali and sugar, while the same proceeding forbids itself if tried with glycerin.

A consideration of the foregoing statements will now enable us not only to understand the theory of the formation of albuminate of iron, but also to intelligently judge the formulæ and preparations of the market, and enable us also to formulate the existing relations and conditions into such shape as to obtain preparations of any desired constitution and strength, be it to embody a real chemical compound or a compound only in pharmaceutical parlance—a mixture, or concoction.

Before all it must be admitted that there is no peptonate of iron possible as a chemical compound. If the term albuminate implies the meaning that albumen acts as the acid radical of the combination, then the same generic appellation applied to peptone should also imply the assumption of the same functions by the peptone. But the formation of a compound with iron, unexpected as it may be, does not take place with peptone. The want of forming a precipitable compound might be explained by its failure to give precipitates of its own on change of reaction, as is the case with all other albumin derivatives. But if taken into consideration that we have the same indifference in glycerin also, it must be the want of chemical affinity rather than physical imperfection which causes this indifference of peptone towards iron.

In a mixture of peptone and a ferric salt, only hydrate of iron is precipitated on neutralization; no soluble compound is formed. In a mixture or pharmaceutical compound of peptone and oxychloride of iron, whatever there is of acid radical is that supplied by the iron solution beforehand, and to name such a mixture "peptonate of iron" implies a misapplication of title. The two components in relation to each other are co-ordinate, and the title should read "solution of iron and peptone." But if, in preparations so named, it is found that they contain albumen and no peptone, the otherwise wrongful appellation takes the character of a misrepresentation.

But the name of peptone is especially captivating and worth while saving, in this age of advanced knowledge, especially with physicians who know enough of peptone to transmit its own supposed properties to that of peptonate of iron, which, thus endowed, could also be supposed to pass the trying ordeal of the complicated laboratory of digestion, pass the final membranes which separate the digested matter from the fecal mass, to be absorbed, resorbed, and assimilated in its totality, hoof and all, untouched, undecomposed.

This would be a dream. For if the peptonate was possible in its present association, with basis in dialyzed iron, it would not diffuse. Dialyzed iron has the name of dialyzed iron because it does not dialyze.

But this iron preparation as it is, divested of its fanciful name, is good enough, and better than many others. Experts in pharmacology found it so; so the public finds it. And an enchanting title is of infinite magnitude, commercially. It helps to sell. It sells a book. The plot need not be true, but plausible; and the success prompts a host of imitators to imitate.

As a proof of the assertion that these specialties are albuminates and not peptonates, the fact that they yield a precipitate on neutralization with alkali, and redissolve again in an excess, should suffice. The fact that the precipitate obtained now from the alkaline solution does not dissolve in dilute acids, strengthens the proof beyond doubt.

Throwing the peptonate of iron out of further consideration, there are only albuminates left for further treatment, of which there is only the alternative of the alkaline normal albuminate prepared from normal chloride, and that of the alkaline basic albuminate prepared from ferric oxychloride.

The alkaline solution of normal albuminate is represented by the "Liquor Ferri Albuminati," Drees, who also established the first formula for its preparation. It is a true chemical compound, the soluble alkali compound of the insoluble ferric albuminate.

This solution is prone to decompose through atmospheric influences, by attracting from it carbonic acid. It is not, however, as stated, the transformation of its alkali into alkali carbonate which causes the downfall of the

iron (and of the preparation too), for carbonates may be employed as well for preparing the solution; but it is the formation of bicarbonate, which is devoid of the faculty to dissolve, or keep the iron in solution.

This preparation, again contrary to printed statements to this effect, spoils the quicker the better it is made pharmaceutically, that is, the less surplus of alkali has been used for its solution.

Of the alkaline iron albuminate the dry preparation cannot be made by the usual evaporation on the water bath, although it stands boiling without coagulation on evaporation; skin after skin is formed on the surface, as in milk, whose constitution as an alkali-proteid is not dissimilar. The final residue is insoluble. It may be expected that evaporation in vacuo may produce a similar soluble dry product to that obtained from milk.

Of the alkaline basic albuminate there is no representative amongst the preparations actually made. E. Dieterich gave a formula of which an important simplification may be found in the following lines:

To prepare a solution of normal ferric albuminate, a mixture of proper proportions of solutions of albumen and ferric chloride is neutralized by alkali. Ammonia or the hydrates of fixed alkalies answer as well, the carbonates of the latter being only impracticable by the large evolution of gas, which causes the albuminous solution to foam excessively. Litmus paper as a guide in the precipitation is excluded, as the precipitation is the most perfect when the liquid shows yet slightly acid reaction. But the formation of the precipitate is the best indicator itself to show its completion, for the precipitate, being creamy at first, becomes flocculent, and on further addition of alkali congregates in large flocks, which subside from the clear liquid, which, if the proportions were well chosen, contains neither iron nor albumen. At this stage the solution of alkali chlorides drains off rapidly on muslin, while an imperfectly precipitated solution shows the imperfection, may it consist in too little or too much addition of alkali, by refusing to drain off. After washing, the precipitate is dissolved by alkali. To insure solubility it is better to add the precipitate to the alkali than to reverse the addition.

Solutions of the basic albuminate of iron may be more simply made. Considering that for each molecule of ferric chloride 6 molecules of alkali chloride are formed, the elimination of this large amount of salt is of paramount necessity in the preparation of ferric albuminate from the normal chloride. But with employment of oxychloride, which requires only $\frac{1}{6}$ part of alkali, or less than the normal chloride, for its neutralization, the washing of the precipitate may well be dispensed with, the more as a thorough washing diminishes the chances of its solubility. As the same contingency also rests with the precipitate obtained from normal ferric chloride, the probabilities are that, if the entire amount of these by-products be left in the final solution of basic albuminate, the contamination will be not more but less than in the former, where such ablution was imperfectly performed. If precipitation be deemed a superfluous proceeding, the preparation of this form of albuminate narrows down to the mixing of specific quantities of albumen and ferric oxychloride in admissibly diluted solutions, and to dissolve the resulting magma by alkali, as stated before.

To form pharmaceutically perfect preparations from these chemical solutions, they are mixed with 5 to 8 per cent of alcohol and properly aromatized. The alcohol is necessary to preserve them.

The proportions in which the components combine may be calculated from data furnished above; practically they are elastic enough for a great divergence, as demonstrated by the various formulæ given, provided there be a sufficiency of albumen. I do not intend to submit a specific formula, for it would have to be agreed upon first, and I am of the opinion that the accepted strength of the imported preparation is too low for American usage. Besides, this standard has to be fixed on the amount of iron, and not on that of the precipitable albuminate compound, which is too variable to admit of its use.

I think it proper to reserve that for the National Formulary, for the sake of uniformity. This investigation had been begun in its interest, and an expansion of it in the shape of an appendix will be timely, especially after the revision of the U. S. Pharmacopœia has been completed.

Of the mixtures made with albumen and oxychloride of iron, there are as representatives the imported preparations known by the fanciful appellation of peptonates of iron. They contain respectively 0.42 and 0.46 per cent of iron, or nearly 0.6 per cent of hydrated oxide, and equal in strength 10 drops of tincture of iron U. S. P. in a fluid-drachm. The precipitate obtained from the preparation by neutralization, best with carbonate of ammonium, consisting of ferric albuminate, weighs three times as much as the ferric hydrate obtained by boiling a sample with strong potash lye, or four times as much as the ferric oxide obtained by calcination of the hydrate of iron previously obtained, or by incineration of either the precipitate of ferric albuminate or the dry residue of the original preparation.

They contain 5 and 8 per cent of alcohol, said to be in the form of brandy, and one contains $\frac{1}{4}$ per cent of

sugar. The specific gravity is nearly that of water, and less in one of the specialties. Their acidity is very small; proportionate to the quantity of dialyzed iron contained therein, it corresponds to 2.5 C.c. of normal potassa for 100 C.c. On addition of minimal portions of alkali they readily change their reaction, forming again perfect solutions. They stand boiling without change, as the albumen is in the state of acid albumin, and mix with alcohol for the same reason. Concentrated acids precipitate both the oxychloride of iron and the albumen. Dialysis reveals nothing.

Chloroform Water as a Preservative.

At the recent meeting of the British Pharmaceutical Conference, Mr. Jos. F. Burnett read a paper on this subject, in which he stated that for the keeping of various chemicals in solution, so as to be convenient in rapid dispensing, nothing that he had tried was so effective and at the same time so free from objection as chloroform water. It is not needed for the solutions of inorganic substances, such as potassium bicarbonate, magnesium sulphate, potassium bromide, etc., which are kept in most dispensing establishments.

The advantage is evident in the case of solutions of organic chemicals which are prone to decompose, ferment, etc., through the presence of fungoid organisms. The following is a list of those which the author regularly keeps made, in each instance solution being effected by dissolving the substance in B. P. chloroform water, and adjusting to the required strength by the final addition of more chloroform water: Citric acid, 1 in 2; potassium acetate, 1 in 2; potassium citrate, 1 in 2; citrate of iron and ammonia, 1 in 2; sodium salicylate, 1 in 2; ammonium chloride, 1 in 4; ammonium bromide, 1 in 4; quinine sulphate, 1 in 10 (by the aid of a sufficiency of dilute sulphuric acid).

Never in any of these is there any fungoid growth, even though they are kept in the varying temperatures of summer and winter for months. Two mixtures which are of equal convenience—viz., powdered rhubarb and aromatic powder of chalk—rubbed down with chloroform water (1 in 8) keep well. Mucilage of acacia made with chloroform water keeps indefinitely.

There can be no drawback to the use of chloroform water as a preservative, for the addition of 1 or 2 drachms, or even an ounce or two, to a mixture cannot have any injurious effect on the patient. None of the medical men for whom the author dispenses object to the addition.

The author next speaks of the value of the preservative in keeping infusions and decoctions. These preparations are, however, so little used here that we omit this portion.

On the same subject another paper was presented by Mr. Wyatt.

Mr. Wyatt's experience is much akin to Mr. Burnett's. Dispensing stock mixtures and solutions made with chloroform water in the proportion of 1 in 4 in the case of inorganic salts, and quinine, morphine, and other alkaloidal salts, in chloroform water alone remain clear and devoid of fungoid growth under conditions which would necessitate the use of at least 25 per cent of proof spirit for their proper preservation.

The action was specially observable with an extract of ergot mixture containing solution of strychnine, which was kept concentrated, but did not keep four days free from mould and trimethylamine odor until chloroform water was used to make it. With this it kept good for three months. The author then proceeded to state that fruit juices keep very well with chloroform added in the proportion of 1 part in 600, the aroma being rather improved than otherwise by the addition, at any rate in the case of raspberry, lemon, and blackberry juices. A sample of raspberry juice was submitted which was prepared by allowing the fruit to stand in a lightly covered jar for about a week, during which time a slight fermentation was set up, the juice sinking clear and the aroma improving. Since July, 1886, the sample has in no way deteriorated. Chloroform is also a great success with essence of rennet, which when preserved with it never acquires the slightest unpleasant odor; but it has no effect on cucumber juice except when 1 to 4 of glycerin is added along with 1 part of chloroform in 600. It is also very good for aqueous solution of opium.—After *Chem. and Drugg.*

A Simple Filter for Small Quantities of Liquid.

TAKE a glass tube, about $\frac{1}{4}$ inch diameter internally, grind off one end quite true, and attach to it a little disc of stout filtering paper moistened with a drop or two of pure water. The glass tube is, of course, to be perpendicular to the surface of the disc.

When a small sample of a liquid is to be filtered off, for instance, from a liquid containing a precipitate suspended therein, insert the end of the tube bearing the filter paper into the turbid liquid, and carefully and gently apply suction until a sufficient amount of the filtered liquid has risen in the glass tube.

This contrivance answers well, for instance, in the volumetric determination of sulphuric acid.—After *Chem. Zeit.*

Salol-Collodion.

It is recommended in the *Répertoire de Pharmacie* for July 10th, 1890, to dissolve 4 parts of salol in 4 parts of ether, and then add to 80 parts of collodion, and it is stated that the application of the salol-collodion to the affected parts in acute rheumatism will be followed by rapid relief of pain.

Antipyrin in Tin Boxes.

SOME antipyrin purchased in January in original 250-Gm. tin cases, when opened in June showed, according to Mr. Grüner, wherever the compound had come into direct contact with the tinned sides of the case, a striking reddish-yellow coloration (*Zeit. österr. Apoth.-Ver.*, June 10th, p. 301). A chemical examination showed the preparation to be otherwise faultless. It was neutral in aqueous solution, odorless, behaved normally towards all reagents, and melted at 112° C. The antipyrin in the cases opened in January was without defect, and some which had been preserved since that time in glass had remained quite white. Mr. Grüner therefore recommends that manufacturers should use glass for packing antipyrin.—*Pharm. Journ.*

The Constituents of Sassafras Oil.

SASSAFRAS oil is, according to the text books, a mixture of 10 per cent of a terpene, $C_{10}H_{16}$, and 90 per cent of safrol, $C_{10}H_{12}O$. Since Grimaux and Ruott's investigation there has always been a suspicion that the oil also contains a small portion of a phenol body; but this has not been satisfactorily demonstrated until lately. Dr. C. Pomeranz, during a recent investigation (*Pharm. Post*), treated 3 kilos of the oil with alkali, and, separating the alkaline solution, treated it with sulphuric acid, and dried the brown oily body which came out with calcium chloride, afterwards submitting it to fractional distillation. Thereby he obtained, at 246° to 247° C., 7 Gm. of a colorless liquid resembling eugenol. A critical examination of this liquid resulted in the conclusion that it is identical with eugenol, $C_{10}H_{12}O$; the benzoyl derivative having a melting point of 69° C., as compared with 69° to 70° C., which is that of benzoyl eugenol.—*Chem. and Drugg.*

Cassia Oil.

As reported by us some months ago, there has been systematic adulteration of cassia oil practised by Chinese merchants, colophony being the substance used for adulteration. According to Hirschsohn's observations (*Phar. Zeit. für Russl.*, xxix., 241), pure cassia oil dissolves in three times its volume of 70-per-cent alcohol to form a clear solution, but as little as 5 per cent of colophony added to the oil suffices to make the solution opalescent, and the opalescence increases in density as the percentage of resin is increased.

By heating to, say, 20° C., the turbidity diminishes somewhat. All the commercial adulterated specimens gave milky solutions with the alcohol.

Another reliable test is based on the solubility of essential oils in petroleum ether, a fluid which does not dissolve resin. Cassia oil dissolves completely in 3 volumes of petroleum ether, spec. grav. 0.650, and if 1 volume of the oil be shaken with 3 of the ether in a graduated tube, other essential and fatty oils, resin and kerosin, if present, will separate, and the amount may be read off. The ethereal solution of the oil shaken with oxyhydrate of copper for a minute, and filtered, should not acquire a green or blue color, which it would have if the oil contained either colophony or resin.—*Chem. and Drugg.*

Antipyrin.

It may interest our readers to learn where this article, now so much employed in medicine, is obtained. There are four firms now engaged in its manufacture, the original German, two French, and one Swiss. It was originally discovered by Dr. Knorr and manufactured by his process at the color works at Hoechst-on-the-Main, formerly Meister, Lucius & Bruening, and it is from that firm that most of the article coming to the United States is derived. A French firm, the Société Parisienne des Couleurs, at Creil, also manufactures exactly according to Dr. Knorr's process, but exports but little as yet. Another French firm, Mialhe—A. Petit, successeur—at Paris, manufactures the same article and sells it under the name of Analgesin. In addition, the Baseler Gesellschaft, at Basle in Switzerland, also manufactures antipyrin largely. The product of all four factories is identical in medicinal properties and in behavior to reagents. The product of the factory at Creil is perhaps not quite so well purified as the other three, for it turns yellow when exposed freely to light, while the other three remain white and correspond exactly to all the tests of purity required by the new Austrian Pharmacopœia, which has adopted

antipyrin into its code. The new official supplement to the English Pharmacopœia also accepts the new remedy, while our own Pharmacopœia is forbidden to receive it, because it is made by a patented process.

[*Note by Ed. Am. Drugg.*—The above note is based on information kindly furnished to us by Prof. Charles O. Curtman, of St. Louis. We may add that in a recent paper on "Tautomeric Bodies" (in *Liebig's Annalen*, 258, 267), J. U. Nef renders it probable that Knorr's interpretation of the constitution of antipyrin, as phenyl-dimethyl-pyrazolon, is not correct.]

Mercurio-Chloride of Caffeine.

In a paper read at the recent British Pharmaceutical Conference, Mr. Davies described a compound of mercuric chloride with caffeine, of the formula $C_8H_{10}N_4O_2 \cdot H_2Cl_2$, which is easily formed upon mixing aqueous solutions of the constituents. The formation of this body will serve, he suggested, as a confirmatory test for caffeine, as the delicacy of the reaction appears to be considerable.

With a solution of caffeine of the strength of 1 in 1,000, abundant crystals are formed a short time after it has been mixed with a saturated solution of mercuric chloride. The reaction is shown by the citrate as well as by the alkaloid. The compound formed is much more soluble in water than in a solution containing excess of the mercury salt. Hence it is advisable to use a saturated solution of the latter when testing for caffeine by this means. The double chloride is also much more soluble in hot water than in cold, and much of it crystallizes out from a hot solution on cooling, which fact furnishes a ready method of obtaining it in a pure form.

Mr. Davies indicated that the compound he described was identical with one mentioned in Watt's "Dictionary of Chemistry," but its production from aqueous solutions appeared to be new, and enabled the reaction to be readily utilized as a valuable confirmatory test for the presence of this alkaloid. He had made an analysis of the body and found it to yield caffeine, 40.6 per cent; mercury, 42.8 per cent; and chlorine, 15.42 per cent, which agrees pretty closely with the above formula. Some fine specimens of the compound were exhibited, and the reaction was practically shown.—*After Chem. and Drugg.*

Codeine Hydrochloride.

CODEINE hydrochloride was first prepared by Anderson by saturating hot dilute hydrochloric acid with codeine (*Annalen*, lxxvii., 348). It was obtained in white stellate-grouped needles, which were described as containing in the air-dried condition 2 equivalents of water of crystallization, of which only half an equivalent was lost at 100° C., and the remainder only at 121°. At the latter temperature, however, some hydrochloric acid was also given off, the dried residue acquiring an alkaline reaction in consequence. Professor Schmidt reports (*Apoth.-Zeit.*, July 9th, p. 366) that three commercial samples, from different sources, examined by him to see how far their properties corresponded with Anderson's statement, were all in the form of white crystalline powder consisting of fine needles, which dissolved readily in water to a neutral solution and corresponded in composition to Anderson's formula, $C_{18}H_{21}NO_2 \cdot HCl + 2H_2O$.

But a remarkable difference was manifested when these compounds were subjected for four hours to a temperature of 100° C. One lost weight equal to 2.5 per cent, corresponding to Anderson's statement; a second lost 5.4 per cent, and the third 3.2 per cent. As the loss in neither case represented the 2 equivalents of water, which required 9.66 per cent, the experiment was tried whether all the water of crystallization could be eliminated by prolonged drying at 100° without involving loss of hydrochloric acid. After from ten to fourteen days the weight became constant, the total loss then amounting to 10.56 and 10.52 per cent respectively, and the composition of each sample, according to the result of a chlorine determination, then corresponded to the formula $C_{18}H_{21}NO_2 \cdot HCl$.—*Pharm. Journ.*

Codeine Phosphate.

CODEINE phosphate was first prepared by Anderson, by saturating phosphoric acid with codeine, the product having the composition represented by the formula $C_{18}H_{21}NO_2 \cdot H_3PO_4 + 1\frac{1}{2}H_2O$. Two commercial samples examined gave results not agreeing with this formula or with each other, the water of crystallization in one case amounting to 7.71 per cent and in the other to 2.80 per cent, whilst the formula quoted required 6.37 per cent. Both compounds, when heated to 100° C., assumed a gray-yellow color (*Apoth.-Zeit.*, July 9th, p. 366). Three other samples were therefore obtained and examined. Sample A was a white crystalline powder, which dissolved readily in water and slightly in alcohol, with a faintly acid reaction. It lost 7.60 per cent of water at 100°, becoming gray, and when anhydrous contained 21.52 per cent of phosphoric acid, or an excess of the quantity required for

an acid phosphate. Sample B, of similar appearance, lost at 100° C. only 2.27 per cent of water, becoming less gray than A, and when anhydrous contained 17.75 per cent of P₂O₅. It corresponded, therefore, to the formula 2(C₁₂H₁₁NO₃H₃PO₄) + H₂O. Sample C, also of similar appearance, lost at 100° C. 8.27 per cent of water, and when dehydrated contained 17.6 per cent of P₂O₅. It therefore corresponded to the formula C₁₂H₁₁NO₃H₃PO₄ + 2H₂O. A sample was then prepared by adding pure codeine to phosphoric acid until there was only a faintly acid reaction, and treating the clear solution with alcohol in excess. The crystalline precipitate, washed with alcohol and dried, corresponded to the formula with 2 equivalents of water, as it did also when recrystallized from water; but when recrystallized from hot dilute alcohol it was obtained in well-formed, colorless, transparent prismatic crystals, containing only 1 equivalent of water to 2 equivalents of codeine phosphate.

It would appear, therefore, that both these forms occur in commerce, as well as one containing excess of phosphoric acid.

As the codeine phosphate prepared under Professor Schmidt's superintendence did not become gray when heated to 100°, it is supposed the coloration noticed was due to an impurity.—*Pharm. Journ.*

Green Iodide of Mercury.

MESSRS. W. MARTINDALE and W. APPLETON SALTER, in a paper read at the recent British Pharmaceutical Conference, described a number of experiments made for the purpose of determining how this salt can be made so as to be of greater stability than the one which was removed from the British Pharmacopœia.

They found that a sample of the salt supplied to them, which kept better than any others, contained a considerable percentage of free mercury, and reference showed that the French Codex and the United States Pharmacopœia both prescribe an excess of mercury. It so happens that in France and America mercurous iodide is more extensively used than in any other country. The authors then proceeded to speak of the decomposition which occurs in the salt, mentioning different theories which have been given from time to time regarding it, and they stated that they were not favorable to the yellow iodide, although some authorities give this the preference. They had made no experiments to prove that the precipitated iodide is more or less unstable, contenting themselves with the statement that the fact is generally accepted that the yellow iodide does change to the red more rapidly than the green. It would seem, however, that most of the assertions regarding the oxidation of the green salt are much exaggerated, as the following results of analysis show:

HgI ₂	Hg ₂ I ₂	HgI ₂	Hg ₂ I ₂
A. 0.1% = 81.6%		D. 0.26% = 86.65%	
B. 0.24% = 83.07%		E. 0.34% = 85.75%	
C. 0.3% = 91.62%			

The red iodide was separated with ether, and the green by solution in acid, precipitation as silver iodide, and weighing. Several of the specimens contained much free mercury, D having no less than 30 per cent. They therefore recommended that one-fourth more mercury should be used than was theoretically necessary, and that the iodine should be added gradually while the two elements are moistened with spirit and well triturated. This yields a preparation well suited for medicinal use. The preparation contains 13.2 per cent of free mercury, and keeps green when stored in amber-colored bottles in the dark. The prescribers whom the authors had to deal with insisted upon having a green salt, and ordered it in $\frac{1}{4}$ -grain doses. The pills are best made with sugar of milk, gum, and syrup. Finally the authors quoted the opinions of Drs. Buxton Brown and Campbell Williams, which were entirely in favor of the salt prepared as suggested.—*After Chem. and Drugg.*

Solution of Salicylate of Iron.

MR. F. W. HAUSSMAN has made experiments on the best method of preparing the salicylate of iron (ferrous) in solution, and recommends the following as giving the most satisfactory results (in *Pharm. Era*), though he adds that it hardly admits of extemporaneous preparation, since some time is required for its completion. It being, however, perfectly stable, a small amount can be kept in stock in localities where a sudden demand is liable to be made.

1. Solution of Ferrous Salicylate.

Salicylic Acid.....	60 grains.
Freshly Precipitated Ferrous Carbonate.....	35 "
Or Saccharated Carbonate of Iron.....	3 drachms.
Glycerin. ..	1 ounce.
Citrate of Potassium	$\frac{1}{2}$ "
Water.....	a sufficient quantity to make 4 ounces.

Dissolve the citrate in the glycerin, using heat, and add the salicylic acid, stirring until dissolved. Add the iron salt in small portions, stirring thoroughly after each ad-

dition, until effervescence ceases. Add the water in several portions and boil the liquid for about ten minutes.

Allow to stand about twenty-four hours, and filter.

The amount of ferrous carbonate is in excess, and on standing it is gradually deposited. The solution is of a dark-brown color, but lighter than the ferric, without odor, and a sweet taste. Reaction acid, spec. grav. 1.20.

It mixes with water, and, if supersaturated with acids, precipitates the salicylic acid without developing an intense violet color. It contains about 2 $\frac{1}{2}$ grains of ferrous salicylate in one teaspoonful.

The solution of ferric salicylate, according to the same author, is best prepared by first obtaining the ferric salt and then dissolving this.

2. *Ferric Salicylate*.—A hot or cold aqueous solution of salicylic acid is saturated with freshly precipitated ferric hydrate, and the filtered solution set aside, when amorphous ferric salicylate will be precipitated.

This precipitation is not prevented by the addition of syrup, glycerin, or alcohol; but the precipitate is completely soluble in water of ammonia.

3. *Solution of Ferric Salicylate*.—This is best made by dissolving the ferric salt with the aid of an alkali citrate.

Ferric Salicylate	80 grains.
Citrate of Potassium.....	120 "
Glycerin.....	1 fl. oz.
Water.....	enough to make 4 "

Dissolve the citrate in the glycerin with the aid of heat, add the iron salt in small portions, stirring after each addition until it is dissolved, and lastly add the water gradually. Heat to boiling and filter while hot. The author himself thinks it better to double the amount of citrate of potassium if the solution is to be kept for some time.

Pyoktanin and Aniline Colors in General as Antiseptics.

PROF. STILLING, of Strassburg, has devoted special study to the aniline colors and their employment in practice, and has (as announced in previous issues) found that methyl violet possesses the highest degree of antiseptic power, and he claims that a one-tenth of 1 per cent solution of this substance could be injected under the skin of a guinea-pig to the amount of 20 C.c. or more without causing any hurt to the animal.

Half that quantity, however, if injected into the peritoneal cavity, proves fatal, the viscera, and especially the kidneys, with the exception of the Malpighian corpuscles, being colored blue. A few drops of the solution instilled into the eyes of rabbits colored the conjunctiva, but left the cornea—if this were uninjured—unaffected, the coloration disappearing the next day.

Prof. Stilling then employed this solution with marked success for the treatment of many eye and other diseases, including scrofulous ulcers of the cornea, conjunctivitis, eczema of the lids, parenchymatous keratitis, serous iritis, disseminated choroiditis, sympathetic ophthalmia, whitlow, varicose ulcers of the leg, etc. A pure form of methyl violet for surgical purposes is now manufactured under the name of pyoktanin.

These results have, however, not been universally confirmed, and Dr. Mauthner, of Vienna, has just published a statement that he has been quite unsuccessful in his trials of this substance in a number of eye cases similar to those in which Prof. Stilling has recorded such favorable results (*Lancet*, July 5th, 1890).

Dr. Carl (*Fortschr. der Med.*, 1890, No. 10) has likewise failed in obtaining satisfactory results. He experimented at first with fuchsin, gentian violet, methyl blue, and finally methyl violet for several months. He has employed the watery solution of methyl violet in the treatment of affections of the conjunctiva, and as a local application, by means of thin camel's-hair pencils, to ulcers of the cornea.

In affections of the conjunctiva he has found the methyl violet to be absolutely inert, while in infiltrated and superficial ulcers of the cornea, although methyl violet has seemed to somewhat reduce the signs of irritation, no such effects as claimed to follow its employment by Stilling were ever observed; and since he employed atropine in conjunction with the aniline colors, it is very doubtful as to what share is to be attributed to the latter. Besides he reports a case of serpiginous ulceration of the cornea where methyl violet appeared to aggravate the course of the disease. Dr. Braunschweig has likewise published results which tend to reduce the enthusiasm which might be expected to follow Stilling's work.—*After Therap. Gazette.*

[Note.—Several prominent practitioners of New York City, who have given these coloring matters (particularly pyoktanin) a careful trial, have arrived at very divergent results. One of them has informed us that he has observed or obtained absolutely negative results. Another objects to the strong tinctorial power of the substance, which is apt to betray itself at the most unexpected time upon the hands or clothes of the operator, in spite of the greatest care. Evidently the trial of the utility of these compounds is not ripe for a verdict yet.—*Ed. AM. DRUGG.*]

Strophanthus Hispidus.*

SINCE their introduction as a medicine strophanthus seeds have varied considerably in quality, so that great variation must have been experienced in the therapeutic value of its preparations. The seeds first used and described by Prof. Fraser were thought to be derived from the plant described by Prof. Oliver in Hooker's "Icones Plantarum" under the name *Strophanthus Kombé*, Oliv., but which is now regarded as a "variety, a geographical race, of *S. hispidus*." The flowers of the plant which yielded these specimens have been submitted by Dr. Fraser to Prof. Oliver, who "expresses the opinion that they are the flowers of *S. hispidus*." Mr. Holmes pointed out, however, that the seeds employed by Prof. Fraser differ both in size and color from those obtained from the typical *Strophanthus hispidus* of the west coast of Africa, this opinion being based on a careful examination of specimens obtained at different times; and he wished to emphasize the fact that the seeds originally used by Prof. Fraser differ from those yielded by the typical *S. hispidus* West Africa, so that preparations made from West African seeds may differ considerably in action from those made with East African seeds. It is therefore important to note that (1) the seeds used by Prof. Fraser possess the following characters: In bulk some of the seeds appear to be of a grayish-green color, and others of a fawn color. This, however, is an optical illusion, which is readily dissipated by altering the angle and direction of the seeds to the light. The hairs on the seeds all point in one direction, and are somewhat appressed to the seed coat. If the seed be first presented towards the light so that the apex is towards the light, and then reversing the seed so that the base of the hair is presented to the light, and varying the angle of incidence, it will be seen that the fawn color appears green, and vice versa. (2) The seeds vary in quality according to the degree of ripeness of the pods and the carefulness with which they have been dried. On breaking a seed across it should exhibit a firm, white endosperm, showing under a good lens a line marking the enclosed cotyledon. All seeds that are shrunken or shrivelled, or that show a dark-colored interior, should be discarded. (3) All seeds that have not a hairy surface, and in which the hairs do not present the alternating grayish-green and fawn color, should not be employed. There has occurred in commerce a mixture of glabrous seeds with hairy seeds, and also a somewhat twisted non-hairy seed belonging to a different genus, *Kickxia Africana*. The latter are easily recognized by the different shape, and the fact that the cotyledons are seen to be doubly folded when a seed is broken transversely. These characteristics suffice to distinguish true from false seeds. Mr. Holmes proceeded to speak of the glucoside ouabain, showing how it differs from strophanthus.

In connection with this paper two leaves were sent by Mr. Thomas Christy from a plant grown by him, and which was propagated from a sample of seeds the origin of which was in doubt. Mr. Holmes wrote from Edinburgh that he had no doubt that the plant which yields true strophanthus seeds should be called *S. hispidus* var. *Kombé*, and that Arnaud's ouabain is strophanthidin, which is a body formed by splitting up strophanthin. Arnaud actually uses acetic acid in his process, and this suffices to effect the decomposition.—*Chem. and Drugg.*

Oleite, or Ricinol-Sulphonate of Sodium.

MR. W. A. H. NAYLOR contributes the following paper on this subject in the *Chem. and Drugg.*

In a paper read before the American Pharmaceutical Association last year at San Francisco on "Pharmacy as Applied to Preparations for the Skin," Mr. Fred. B. Kilmer communicated some interesting facts respecting a substance known as oleite (see this journal, 1889, 194). Chemically this substance is essentially ricinol-sulphonate of soda.

The following descriptive outline of the method of its production is furnished by Mr. Kilmer: "It is prepared from castor oil by treating with sulphuric acid at a low temperature, when a compound of sulphuric and ricinoleic acid is formed. The free sulphuric acid being removed by washing and any unchanged oil by ether, the resulting sulphuric ricinoleic acid is then neutralized by sodium hydrate, the finished product being a jelly-like liquid, with a little odor, acrid taste, soluble in water, alcohol, chloroform, and essential oils." This description is characterized by brevity and vagueness, while the latter part of it is unfortunately so worded as to invite, if not literally to compel, the deduction of an erroneous inference. In the absence of particular knowledge of the action of sulphuric acid upon certain oils, one would conclude that the product of the reaction between the castor oil and the acid—sulphuric ricinoleic acid—was not sensibly soluble in water or in ether, while as a matter of fact the reverse is the case.

My present object is simply to supply a working formula for the soda compound, one that I have used and can recommend.

* Abstract of a paper read at the recent British Pharmaceutical Conference by E. M. HOLMES, F.L.S.

Take 1 pound of castor oil, and add to it gradually, with continuous stirring, 2 ounces by weight of sulphuric acid (B. P.). This part of the process will occupy several hours, and should be timed so as to be finished towards the end of the working day.

In the morning introduce in the same manner 1 ounce by weight of the acid, or a sufficiency. The point of finality is reached when the product remains clear, or, as is generally the case, is only faintly opalescent when diluted with about 40 times its volume of distilled water.

It is convenient for me here to interpolate the remark that the application of a suitable amount of heat is favorable to the reaction. The temperature of the mixed oil and acid may be allowed to reach 110° F., and may, without detriment, even rise to 120° F. When chemical combination is complete, the product is at once intimately mixed with 1½ times its weight of distilled water, and allowed to stand until separation into two distinct portions has ensued. The supernatant and oily layer is then removed and neutralized with a 10-per-cent aqueous solution of caustic soda. This soda compound is shaken up with five times its volume of proof spirit and set aside, when any free oil will rise to the surface. The lower and spirituous portion is evaporated on a water bath to a thick jelly, the liquid being kept faintly alkaline by the addition of soda solution if necessary. The resulting product usually contains a small proportion of sulphate of soda, but the quantity is insufficient to rank as a serious objection, in view of the uses to which oleite is likely to be applied. If, however, in any case it is deemed necessary to eliminate traces of alkaline sulphate, the ricinol-sulphonate of soda must be treated with alcohol, in which the latter is soluble and the former practically insoluble.

The free acid (ricinol-sulphonic acid) may be readily obtained by decomposing the soda compound with hydrochloric acid.

Gum Picking in Trieste.

AMONG the working population of Trieste the "sessolotte," or "shovellers," form a distinct and easily recognizable class. These "sessolotte" are the girls employed in sorting and classifying gums, figs, dates, and other produce for which Trieste is an important market centre. They lift the goods out of the original packages by means of a "sessola," or small wooden scoop, and place a supply on a small wooden table made for the purpose.

The "sessolotta" holds a knife in her right hand, and with this and the fingers of the left hand she is able to sort, in an incredibly short time, the gum or other material which she is told to pick, according to size and quality. It is said that the natural gum arabic as it arrives in Trieste has to be picked twelve times in this manner before it is finally fit to be brought into commerce as finest hand-picked quality.—*Chem. and Drugg.*

Valuation of Spices.

PROFESSOR HILGER gives the following percentages as the highest for ash which he has found in commercial samples of the genuine spices:

	ASH.	INSOLUBLE IN HYDROCHLORIC ACID.
Black Pepper.	6.5 per cent.	2.0 per cent.
White Pepper.	3.5 "	2.0 "
Cinnamon.	5.0 "	1.0 "
Cloves.	7.0 "	1.0 "
Pimento.	6.0 "	1.0 "
Mace.	2.5 "	0.5 "
Nutmegs.	5.0 "	0.5 "
Saffron.	8.0 "	0.5 "
Ginger.	8.0 "	0.5 "
Caraway.	8.5 "	3.0 "
Fennel.	10.0 "	2.0 "
Cardamoms.	10.0 "	2.0 "
Anise.	10.0 "	2.0 "
Capsicum.	5.0 "	0.5 "

—*Chem. and Drugg.*

Oil of Pennyroyal is manufactured in Southwestern Ohio to a large extent. Guernsey Co., Ohio, has produced as much as 3,000 pounds in one season; but the product is variable—last year the amount was not more than 100 pounds. It is also made in small quantities in Illinois, Virginia, North Carolina, and Missouri. The distillation of the oil is carried on in the simplest manner possible, with very crude apparatus. The yield of oil varies with the season and the condition of the herb when gathered. The largest amount and best quality is obtained from the herb gathered while in bloom and partially dried.—*Chem. and Drugg.*

"Arctic Pharmacy."—The northernmost pharmacy in the world, compared to which those in Iceland are situated in summer seas, has temporarily ceased to exist.

It was the Apotheke at Hammerfest, the Norway town on the Arctic Sea, and the fire which consumed that town recently consumed it.

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EDITORIAL.

We have devoted this number to the report of the meeting of the American Pharmaceutical Association, at Old Point Comfort, and to some of the more important papers presented, believing that it would interest our readers to have the report as nearly complete as possible in one number.

The lectures at the College of Pharmacy of the City of New York, for the session of 1890-91, will begin on Monday, October 6th, at 3.45 P. M. Extensive improvements have been made in the college building, affording more room for quiz-classes, and more than doubling the size of the library.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,480.—Grease for Glass Stoppers, Stopcocks, etc. (S. A.).
In selecting a grease or fat for rendering glass stoppers, etc., tight, or preventing them from becoming cemented, regard must be had to the nature of the liquid contained in the bottle or other glass vessel (burette, etc.). Under most circumstances a thin coating of petrolatum or paraffin oil will answer. This is especially useful when the bottles contain solutions of caustic alkalies, tannin, chloride of lime, etc. In the case of chloroform (which our subscriber inquires about) the above coating would be entirely inadmissible, since the chloroform would dissolve it. If the stopper of the bottle is ground carefully and fine, there is usually no need of coating the stopper at all; but if it must be done, then the best medium is glycerin, a very small amount of which may be applied to the stopper.
To render glass stopcocks perfectly tight and prevent them from becoming cemented, the same substances may be used as for glass stoppers. But many prefer for this purpose either a mixture of tallow and wax in proportions suitable to the climate or season of the year—it should have the consistence of cosmetic, and may be made of about equal parts of wax and tallow—or a mixture of 1 part of caoutchouc and 2 parts of petrolatum melted together at a temperature of about 300° F.

No. 2,481.—Pulvis antispasmodicus (M.D.).
There is no standard preparation to which this term applies. The formularies of various hospitals here and in Europe contain preparations which go by this name; but it would not be proper to dispense these, unless it is positively known that one or the other of these formulæ is actually intended. Your inquiry appears to refer to a prescription written by a physician in Germany. In this case it may be either Stahl's antispasmodic powder, composed of the following:

Potassium Sulphate	5 grains.
“ Nitrate.....	5 “
Red Sulphide of Mercury.....	1 “

—(to be taken as one dose, in water; larger doses, in the same proportion, are also given, with caution)—or, the preparation of the Berlin Pharmacopœia Pauperum (Pharmacopœia for the Poor) may perhaps be meant, which is as follows:

Prepared Oystershell.....	10 parts.
Valerian Root, pd.....	10 “
Mistletoe Twigs, pd.....	5 “

(Dose, about 5 to 10 grains.)
This is particularly intended for children suffering from spasms.

No. 2,482.—Terebene (Baltimore).
Our correspondent complains that a supply of terebene which he has received from a wholesale dealer in drugs has proven, on administration, to be exceedingly irritating and to have developed symptoms showing that it consisted wholly, or mainly, of unaltered oil of turpentine.
This is not at all surprising to us, since we have had the same experience repeatedly. We have made it a rule never to allow an invoice of terebene to be broached for consumption, unless we have proven its optical neutrality by the polariscope. Of course, we realize the fact that this instrument is not likely to be found in many drug stores; nor can this be expected. But to those who wish to make sure about the correct quality of the terebene they dispense, we would give the advice, when ordering, to demand that the bottle or bottles be labelled “Terebene, optically inactive,” and that the bill contain the same words. This would enable the purchaser to have recourse to the seller or maker, should any damage result from the administration of the article. It is well known that there are some perfectly reliable brands of terebene in the market. These are invariably labelled as above stated, or with words to the same effect, and have the manufacturer's name on each package, all of which constitutes a tolerable guarantee. Yet, as stated before, there is no absolute certainty without controlling the liquid by means of the polariscope.

No. 2,483.—Albuminate of Mercury (P. J.).
Solution of albuminate of mercury has been employed hypodermically, with success, in syphilis.
The strength of the solution is usually so adjusted that each cubic centimeter corresponds to 0.1 Gm. of corrosive sublimate, or 45 grains in a fluidounce. A solution of this strength may be preserved, without change, for several months, if it is kept in a dark place. For actual use it must, of course, be suitably diluted, in accordance with the physician's direction. Under no circumstances must any liquid “albuminate of mercury” be dispensed, unless the prescriber has stated the exact strength, or has given such other directions as will make it quite clear what the exact strength is intended to be.

A solution of albuminate of mercury of the strength above mentioned may be made in the following manner:
Into a filtered solution of egg albumen, which must be in excess, pour a 5-per-cent solution of corrosive sublimate. Separate the precipitate, which consists of “mercuric albuminate” (so-called), and dissolve it in a sufficient quantity of solution of common salt of the strength of 20 per cent. Finally dilute with water so that each cubic centimeter will correspond to 0.1 Gm. of mercuric chloride used. This is the formula given by Beckurts and Hirsch (“Handb. d. prakt. Pharmacie,” ii., 110), who add the remark that (according to A. Schneider) the mercuric albuminate is *not dissolved* by the chloride of sodium, but is *split* by it into its component parts. Yet the resulting double salt (sodium chloride + mercuric chloride) does not precipitate the albumen accompanying it; hence the so-called solution of albuminate of mercury is really a solution of sodium chloride + mercuric chloride + albumen. The double salt contains, for every molecule of mercuric chloride, almost exactly 6 molecules of sodium chloride.
Dieterich gives the following formula:
Beat 25 Gm. of fresh white of egg, allow the beaten mass to become fluid by standing, and then add, under stirring, a solution of 5 Gm. each of mercuric chloride and sodium chloride in 80 Gm. of distilled water. Set the mixture aside during one or two days in a dark place, then filter. This solution is weaker than the former, being about 1 in 20.

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Whole No. 197.

EGROT'S TILTING STILL.

As is well known, when alcoholic liquors are distilled the ordinary still furnishes at the first operation a liquid that has to be distilled a second time in order to obtain common spirits. In order to simplify these operations, Mr. Egrot, about two years ago, devised a new type of still that permits of obtaining rectified spirits at the first operation. This apparatus is held in some favor, and so we think it of interest to make its principle known. It consists essentially of a still in which the liquids to be distilled are placed, and communicating with the refrigeratory through an inclined pipe. The still, A (Fig. 2), is placed in a furnace, B, of which the part C is so arranged that the still can be tilted in front. It suffices for this to manœuvre the lever seen to the left of the engraving, when the toothed wheel, D, will revolve upon E, and the still will take the position shown in Fig. 1. The cover, G, of the still is provided with a screw plug, H, for the filling, and a swan's-neck connected with the refrigeratory by a screw coupling. The refrigeratory consists of two copper worms, L and M, upon which water falls in a shower. The poor vapors that condense in the worm L return to the still. As for

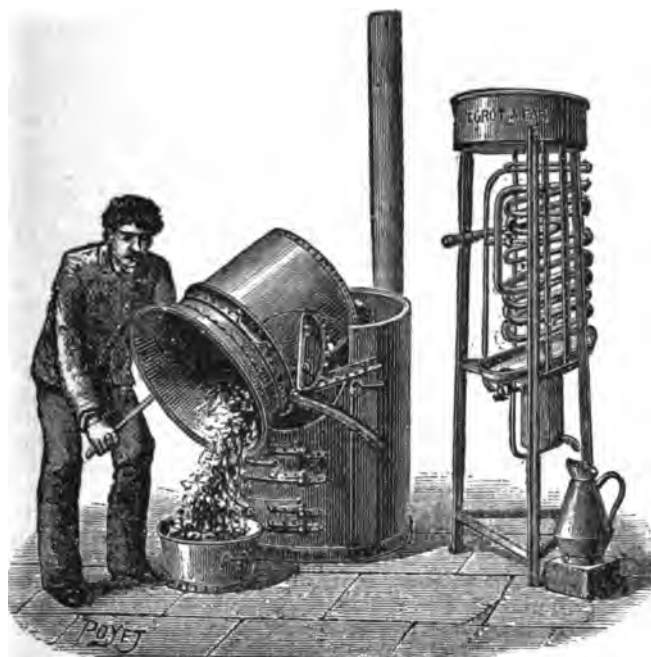


FIG. 1.

Egrot's Tilting Still.

the vapors rich in alcohol, they pass through the worm M into the refrigeratory, N, and make their exit at O in the state of alcohol. Water from a reservoir, K, descends through the tube P into the refrigeratory, N, and then ascends through the tube Q above the worm L, and falls in a shower upon both worms. This water is collected in a reservoir, T. The discharge of the water is regulated by the cocks, R and S. The operation of the apparatus is very simple. The materials to be distilled are introduced into the still, A; the cover is put on and the coupling screwed up. The cocks, R and S, having been closed, the reservoir, K, is filled with water and a fire is lighted in the furnace. After ebullition has started in the still and the worm L has begun to heat, the cock S is opened slightly, so that the water may spread over the worms in a very fine shower. The impure vapors that condense in the worm L return to the still. Nothing but the alcohol vapors pass into the worm M; here they condense, are cooled in the refrigeratory, N, and are collected upon their exit. During this entire operation the cock R must remain closed. If it is desired to distil very rapidly, without endeavoring to produce rectified spirits, the cock S is kept closed and the cock R is opened. As the worm L is no longer cooled, the aqueous vapors will not condense therein, and will go directly to the worm M, where they alone will condense. It will be readily understood that the degree and quality of the spirits can be thus regulated at will by increasing or diminishing the opening of the cock. The principal advantages of this apparatus are as follows:

1. One man can tilt the still and empty it without any trouble. As the still is cleaned in this position the operation is easily effected. The still resumes its position without having to be remounted and luted.

2. With this apparatus spirits of 50° and 60° or more can be obtained at will at the first operation and without faints. The refrigeratory consumes less than half the water required by that of any other still known. The capacities of these stills range from 6 to 200 gallons.—*Scient. Amer. Suppl.*

[ORIGINAL COMMUNICATION.]

PEPSIN AND ITS TESTS.

BY DR. ADOLPH TSHEPPE, OF NEW YORK.

At the recent meeting of the American Pharmaceutical Association, held at Old Point Comfort, Va., Dr. R. G. Eccles read a paper entitled "What is Pepsin?" which was illustrated by a number of demonstrative tests. During the reading of this paper the conviction gradually took possession of my mind that the inferences drawn were based on conclusions not recognized by the present state of knowledge, and that they were based on erroneous premises.

The paper has since then appeared in print (*Druggists' Circular*, October number), inviting an open response on a broader basis. *Audiatur et altera pars.*

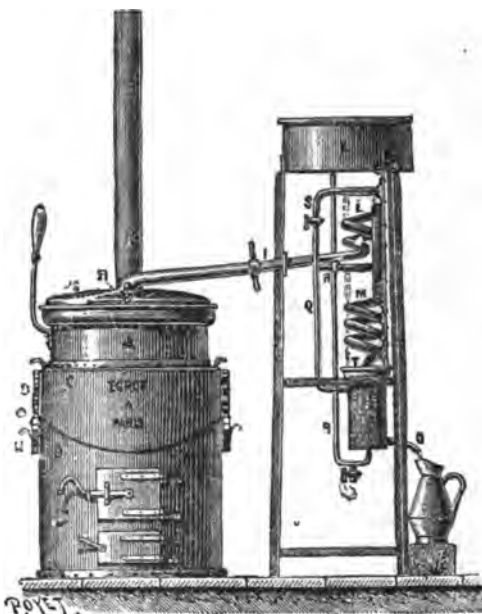


FIG. 2.

The main purport of the paper was to propose two new features of pepsin assay, suggested by the supposed fallacy of the current test which is based on the proteolytic or dissolving action of pepsin. Assuming that it be the acid alone which dissolves the coagulated albumen, a modification of the present test is proposed by the author by which the digestion is carried on until complete peptonization of the albumen is obtained.

The other proposed test is based on the supposed discovery of the active principle of the commercial preparations of pepsin. This was stated to consist of a substance which separates when a pepsin solution is boiled, and this substance, as well as not, might represent the peptic ferment proper. This something the author suggested to name "peptose." But neither has the alleged solubility of albumen in diluted hydrochloric acid, without the intervention of pepsin, been proven by the author, nor was the relation of the "peptose" to pepsin established by any acceptable confirmatory evidence.

Following in the train of such hypotheses, much space was devoted to theoretical speculations and inferential arguments, all of which would become obsolete objects for further consideration, if it were not for the fact that some practical conclusions arrived at by the essayist needed a more detailed refutation.

The first part of the paper consists of considerations based upon the author's assumption of the solubility of albumen by acid alone.

Rumors as to the solubility of coagulated albumen by acid alone had been whispered about for years, but I have no recollection of the question having ever been brought up for discussion in print. For then, doubtless, one of the many able experimenters in this direction would have stepped forward to disprove the assertion. But rumors

are not tangible enough to grapple with, or no one found it worth his while to waste any good powder on a shadow. The truth is that the alleged solubility does not exist, and that the author must have been misled by improperly conducted experiments. This solubility reduces itself to the fact that it is impossible to coagulate albumen completely if a hen's egg be boiled in the shell. Owing to the natural alkalinity of the albumen, a portion of it escapes coagulation by transformation to alkali-albumen. This phenomenon becomes more apparent when a filtered solution of egg albumen is brought to boiling, when it will refuse to coagulate.

The strong alkalinity is not even made apparent by litmus paper, for the solution does not coagulate if the alkali be fully neutralized. A larger proportion of acid is needed to effect precipitation on boiling, but beyond that proper amount coagulation is again prevented by formation of syntonin.

From the coagulated jelly of a boiled egg the soluble part of albumen which is embedded in the coagulum cannot be readily removed by washing, owing to its colloidal nature, even if the mass be finely divided. It will continue to yield soluble matter to a suitable menstruum on digestion.

But if the floccular coagulum, obtained from a strained solution of albumen by heat under addition of the proper amount of acid, be thoroughly washed and then digested in $\frac{1}{100}$ diluted HCl at incubation temperature, it will be found that not enough can be dissolved after twelve hours to yield a reaction with iodo-hydrargyrate of potassium, capable of indicating albumen in 100,000 parts of solution.

The whole train of arguments that swing around this common pivot must fall when this falls, and the remark gains some significance that "not to know this is to be constantly liable to give unfair and false results." But let us see:

Assuming that the author's theory be correct, the doctor offers a new theory of the process of digestion. He makes the acid alone dissolve the albumen, forming syntonin. This, "acting as an oxide," protects the albumen from solution, until the pepsin steps in, "removes it from the way of the acid"—namely, the syntonin—by transforming it into parapeptone, when the acid returns again to the pepsin to dissolve it. According to this view, a small quantity of acid could officiate in the solution of a large amount of albumen, which is known not to be the case. Again, the syntonin is easily soluble in the acid liquor and could not afford any protection to the albumen; and the parapeptone, "named by Meissner," and the syntonin of to-day happen to be *one and the same thing*. This as well as the metapeptone, also "named by Meissner," are now things of the past, and only serve as landmarks for chronological stages of the evolution of this branch of science. The metapeptone of Meissner, which the doctor wants to perform some extraordinary feats later on, has been dismissed from the list for its too great similarity to insoluble protein.

A further mistake of the author is the method recommended by him to free a solution of albumen from globulin. Such a solution of albumen, freed from globulin by filtration (sic), and opalescent only through heating it, was shown as an ideal preparation of coagulated albumen, the doctor pointing to the fineness of the division of the albumen, representing it as a "standard preparation" for the pepsin test.

Such a solution of albumen the doctor stated to have used in his subsequent experiments to establish factors of the activity of commercial brands of pepsins, by subjecting them to his modified pepsin test, to complete digestion.

By these tests the doctor came to the conclusion that the power of commercial pepsins to peptonize albumen was only $\frac{1}{4}$ part of the dissolving power claimed for them. The proportion of pepsin to albumen is given as 1 to 200, and a table is appended to show the result of ten trials of different brands of pepsin. But it is not stated in what manner the figures of the table were arrived at. The table shows only that, in the most energetic samples, all the albumen that was dissolved was also peptonized in 8 hours. In the groups of inferior quality the solution of albumen took a longer time, and not all was peptonized during the same time. But it is not proven that even the worst specimens would not have peptonized all the albumen they dissolved, had the time been duly extended; nor is it proven that any of the samples would not have dissolved and peptonized ten times as much albumen, had more been present, since some of them digested all there was.

As long as we regard pepsin to be a uniform ferment, it is not likely that we should expect a difference in the dissolving and the peptonizing power. But it is quite natural that the first stage be finished with much more vigor than the last, and that a pepsin which may convert a large amount of albumen into peptone may be slow to entirely convert a smaller amount without residue. While we can readily separate the products of the first stage—discernible even by the eye—so as to find the amount converted, we cannot separate those of the last stage with any degree of accuracy. While we easily may arrive at the end of the first stage—visible by the disappearance of the albumen—it is impracticable to wait for the comple-

tion of the last, owing to the progressive decomposition of the peptone molecule.

The proteolytic test itself is less uncertain than the author would admit. Owing to the catalytic action of the ferment, its assay is conditional, depending on the similarity of the circumstances, while an absolute test is forever out of question. Under stipulated conditions a pepsin sample may dissolve 200 parts of albumen, while it may dissolve 200,000 parts under different circumstances. Under like conditions, as in comparative assays, the results are fairly accurate.

To explain the variability of digestion under varying conditions, we must regard albumen as a chemical unit, like all other individual substances we know of, subject to the common law of chemistry to form combinations in certain specific proportions and under specific conditions.

Thus, diluted hydrochloric acid does not dissolve coagulated albumen—"if the quantity be only large enough," as the author stated—if the acid be too weak to do it. Neither can a given quantity of acid dissolve *any* amount of albumen if the acid be not strong enough to dissolve a certain proportion. I have found experimentally that dry albumen requires $\frac{1}{10}$ of its weight of HCl to form soluble syntonin, which corresponds to $\frac{1}{4}$ of its weight of the diluted official acid. This proportion has to be present if coagulated albumen is to be dissolved by the intervention of pepsin. The peptic action stops when the acid is consumed; it begins again when more acid is added. A further condition of the peptic action is that this acid be within the limits of a certain strength, therefore the universal usage to employ the 2 to 5 per 1,000 diluted acid; but it is the *absolute* quantity of acid which is the *paramount* factor to operate successfully with specific amounts.

We may calculate beforehand that it will take 100 C.c. of a $\frac{1}{100}$ HCl to dissolve 4 Gm. of dry or 30 Gm. of jelly form (20 of dry, or 150 of boiled) egg albumen; that 500 C.c. of the same acid may dissolve 20 or 150 Gm. with the same quantity of ferment under extension of time. Moreover, the time required for solution depends upon the division of the albumen. If the pieces be large and the points of attack fewer, more time is required; but if time is not concerned the pepsin will finally dissolve either. If pepsin is allowed to act on a surplus of albumen, instead of being required to dissolve *all* the albumen presented, the variations of results obtained are lessened if the other conditions be equal. It is therefore possible to compare samples of pepsin, independent of a standard sample, with a sufficient degree of certainty by equalizing the conditions. Any other method of assay dependent upon digestion would be subject to similar conditions and uncertainties and be less practical withal.

While trying to unravel the nature of the commercial brands of pepsin, the author comes to the conclusion that the soluble part of the pepsins consisted of peptone, while the insoluble part was invariably mucin. He came to that deduction because he found that they all responded to the biuret test, or could be made to do so by treatment with acid. But peptone, as well as other albumen derivatives (but *not* unchanged albumen), is a natural constituent of the gastric juice. Mucin comes from the pyloric part only, and may be absent, inasmuch as it is precipitated by acid and therefore easily removed.

The peptone color reaction does not belong to peptone exclusively, but more or less to all albuminoids; and its affirmative reaction does not prove that the substance is *all* peptone, any more than the gilding of brass transforms it into solid gold. Not the proof of its presence alone, but the proof of the absence of everything else, proves a thing to be what it appears to be, unless it be characterized by determining its quantity. Even those pepsins which are professedly peptone pepsins contain only the larger part of their albuminous substance changed to peptone.

To judge the pepsins by their mode of production, they may be classified into: 1. Raw pepsins, obtained by scraping the mucous membrane of the stomach and drying it. This is the oldest of methods, best known in English countries under the name of Beal's process. Also, the entire mucous membrane may be dried and pulverized; also scaled; in either case the insoluble part consists chiefly of morphotic elements of the stomach, as evinced by the microscope. Mucin, although making itself very noticeable, is present in almost imponderable amount. If this insoluble part be removed, we have the representation of the most powerful modern brands in great perfection. The salts, or the acid (natural or added) and salts combined, render the product deliquescent, but either may be to a great extent removed. 2. The peptone pepsins are dilutions of the above, through additions of part of the mucous membrane, or of the stomach itself, *dissolved by artificial digestion*. 3. Different from both are the pepsins by Scheffer's process, which consist mostly of the precipitated acid albumen, while the rest of the soluble parts—the salts and the peptone natural to the stomach—are removed. When acid, these pepsins are readily soluble; when neutralized, they lose their solubility more or less, but become soluble again by addition of acid.

Main stress was laid by the author upon the "peptose," or "cooked pepsin," as he called it. It consists of

a scanty precipitate occasioned by boiling pepsin solutions. Although the gastric juice does not coagulate on boiling, it will do so if partly neutralized. It is the property of acid albumen not to precipitate on boiling while its solution is acid, but it does so when the acid is nearly removed. The same happens when it is kept in solution by alkali phosphates, whether acid or alkaline. These conditions prevail in the products obtained from the stomach, and the phenomenon of precipitation explains itself.

There are pepsins in the market, of high digestive power, which yield no precipitate on boiling (Hawley's, Witte's), and in most of those that do, the faculty of precipitation may be prevented by simply adding muriatic acid (Fairchild's). Pepsin may be rendered free from albumen (Kuehne's process), and is then stated to be devoid of albuminous properties and consequently also of the faculty of being coagulated.

As easily as this faculty to precipitate can be removed, it might be added to a preparation of pepsin, by adding precipitable albumen. Either unfits this reaction to serve as a test of the effectiveness of pepsin.

The correlation between the amount of precipitate when a solution of pepsin is boiled, and the digestive power of the same pepsin, asserted by the author, obviously cannot exist.

Volumetric Estimation of Chlorine in Urine.

THE employment of chromate of potassium as an indicator in the titration of chlorides with silver nitrate necessitates the operation being carried out in a neutral solution. Since this is frequently an unfavorable condition, Dr. A. Corvi has elaborated a method of procedure, applicable to all solutions acidified with nitric acid, which can therefore be employed with advantage in urine analysis (*L'Orosi*, August, p. 253). To 10 C.c. of urine, acidified with a few drops of nitric acid, a measured quantity of decinormal silver nitrate solution, more than sufficient to precipitate all the chlorine, is added, and the solution then filtered. The excess of silver nitrate present in the filtrate is then determined by titration with a decinormal potassium ferrocyanide solution, using ferric sulphate as an indicator.

The silver is precipitated as a ferrocyanide according to the equation, $K_2Fe(CN)_6 + 4AgNO_3 = Ag_4Fe(CN)_6 + 4KNO_3$. The end of the reaction is indicated by the appearance of the azure-blue color of ferric ferrocyanide, which does not disappear by continual stirring if all the silver nitrate be decomposed. From the quantity of ferrocyanide solution used, the amount of silver removed as chloride may be easily estimated. The author reports that the method gives very accurate results.—*Chem. and Drugg.*

Detection of Impurities in Alcohol.

M. E. MOHLER, in a note published in the *Comptes Rendus* (cxi., p. 187), points out that the reagents usually considered the best for detecting impurities in alcohol—viz., sulphuric acid, bisulphite of rosaniline, acetate of aniline, and permanganate of potash—are only useful within certain limits. He has made experiments with alcohol containing known quantities of the bodies usually found in it as impurities, which show that sulphuric acid cannot be used to estimate the impurities, and is of use to detect only such of them as give a color with it. With bisulphite of rosaniline, the reaction obtained will depend much upon the relative proportion of sulphuric acid and bisulphite of sodium in the reagent employed, even pure alcohol being colored if only a little acid be used, whilst if both the ingredients are present in too large quantity, the part of ethylic aldehyde cannot be detected.

He recommends the use of a solution of the following strength: Thirty C.c. of a solution of fuchsin of 1 part in 1,000; 20 C.c. of a solution of sodium bisulphite (34° B.); sulphuric acid, 3 C.c.; distilled water, 200 parts.

It should be used soon after preparation, and in the proportion of 4 C.c. to 10 C.c. of the alcohol to be tested. This solution does not act on alcohols and ethers, but will detect various aldehydes readily. It will not, however, serve for quantitative estimation, the coloration not being proportional to the impurity present. Acetate of aniline in acid solution is a good reagent for furfural, as it does not react with other alcohols, aldehydes, and ethers.

As small a quantity as 1 Mgm. of furfural per liter of alcohol can be detected by this reagent used in proper proportions. With regard to permanganate of potassium in acid solution, it was found to be decomposed by paraldehyde, isobutylic aldehyde, and isobutylic alcohol. The reduction being proportional to the amount of aldehyde present, it can be used to distinguish ethylic aldehyde and paraldehyde, only the latter instantaneously reducing the permanganate. In the case of the aniline reagents, the full intensity of the coloration is developed in half an hour.—*Pharm. Journ.*

Nitro-glycerin is said by Dr. W. C. Klonan, of Baltimore, to be a very efficient antidote for poisoning by illuminating gas. He uses it by subcutaneous injection, employing a solution of $\frac{1}{4}$ per cent.—*N. Y. Medical Journal*.

An Improved Process for the Preparation of U. S. P. Spirit of Nitrous Ether is Desired.

BY E. G. EBERHARDT, PH.G.

THE question brings up an old subject, one that has been treated by numerous writers, and no doubt answered by each to his own satisfaction. I am in no position to offer a final answer, but desire only to detail the results of a few experiments, made some time ago it is true, but nevertheless of interest in this connection. In the U. S. P. process for Sp. *Ætheris Nitrosi* the proportion of alcohol used to the quantity of acid is far in excess of what is theoretically required, and the result is a large proportion of alcohol in the distillate.

The simplest manner in which the reaction could take place is thus:



It would require about 101.1 parts by weight of 91-per-cent alcohol to 90.8 parts of nitric acid, sp. gr. 1.42.

It is also obvious that the reduction of the acid to the nitrous condition occurs at the expense of a portion of the alcohol, resulting in the formation of aldehyde and other side products. It occurred to me that with the use of less alcohol and a proper reducing agent a more satisfactory result could be obtained. Accordingly the following were tried:

EXPERIMENT.	PROPORTIONS.	REMARKS.
A	Alcohol fl. oz. 2½ Nitric acid, Water aa. fl. oz. 2½ Sawdust.	Reaction uniform, but condenser inadequate; 5 C.c. of distillate yield 39.6 C.c. NO = 12,612 Gm., or about 29 per cent of ethyl nitrite.
B	Alcohol fl. oz. 5½ Ac. nitric, Ac. sulph. aa. fl. oz. 2½ Water " 4 Zinc av. oz. 1½	Yields 4 fl. oz. of distillate of penetrating odor, sp. gr. 0.8347; 5 C.c. yield 31.9 C.c. NO = 1,016 Gm., or 28 per cent $C_2H_5NO_2$.
C	Alcohol fl. oz. 5½ Nitric acid, Water aa. fl. oz. 4½ Sawdust av. oz. ½	Product 26 fl. drachms, sp. gr. 0.8329; 5 C.c. yield 59.1 C.c. of NO = 1,882 Gm., or 42.2 per cent ethyl nitrite.
D	Alcohol fl. oz. 6 Nitric acid " 2 Sawdust grains 219	Product measures 8 fl. oz., sp. gr. 0.8748; 5 C.c. yield 55.4 C.c. NO = 17,644 Gm., or 40.4 per cent of ethyl nitrite.
E	Alcohol fl. oz. 7½ Acid Sulph. fl. drachms 7 Acid Nitric. " 16 Water " 8 Sawdust grains 219	Proportions are approximately those of the U. S. P. Product 23 fl. drachms, sp. gr. 0.8812; 5 C.c. yield 51.8 C.c. NO = 165 Gm., or 37.5 per cent of ethyl nitrite.
F	Residue from E. Nitric acid, Water aa. fl. oz. 2	Distillate measures 8 fl. oz., sp. gr. 0.9012; 5 C.c. yield 33.5 C.c. of NO = 1,066 Gm., or 28.7 per cent of $C_2H_5NO_2$.
G	Residue from F. Nitric acid, Water aa. fl. oz. 2	Product measures 6 fl. drachms, and contains—assayed as above—7 per cent of ethyl nitrite.

Allen's process of assay for spirit of nitrous ether was utilized. A nitrometer was extemporized by attaching to an inverted Mohr's burette, by means of a short piece of rubber tubing, the lower portion of a broken burette, interposing a pinchcock between the two, and setting the whole into a cylinder of brine.

The contents of the burette in cubic centimeters from the pinchcock to the zero mark, including the ungraduated lower part, was ascertained, and by deducting from this the amount of brine remaining in the tube at the time of reading, the volume of NO evolved was obtained; corrections for temperature and pressure were not made. All the products excepting B were of good color and odor. C, D, and E boiled distinctly at the temperature of the room upon the insertion of a thermometer or other object. B had a rather disagreeable odor, owing to the side products. The addition to the residue, left in the retort from experiment E, of more nitric acid, resulted, as we see, in the production of considerably more ethyl nitrite, while a repetition of this treatment (G) gave but very little more. Accordingly, twice as much alcohol by volume as acid would seem about the right proportion in which to use the two. The use of sawdust has two principal advantages: First, it acts as a reducing agent, and, secondly, it remains suspended throughout the liquid, and materially aids in the evolution of the vapors. I was most favorably impressed with the smoothness and uniformity with which the reaction progressed in every case where sawdust was used. It required the application of but very little heat from the water bath to start it, then by raising the retort above the bath the distillation pro-

ceeded uniformly until near the close, when a very little more heat was required.

The best results would probably be obtained by the following:

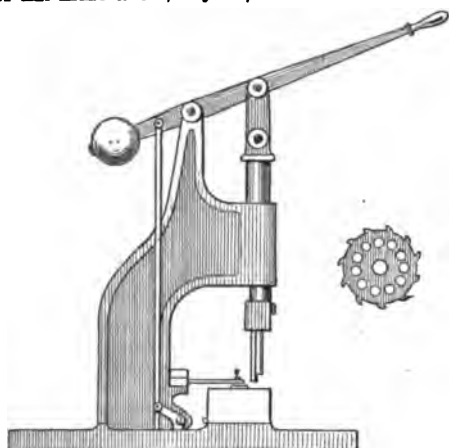
Alcohol.....	12 fl. oz.
Nitric acid.....	6 "
Water.....	3 "
Sawdust.....	1 av. oz.

Place the sawdust in a flask of not less than 32 ounces' capacity, add the alcohol, then the acid and water previously mixed and cooled, and, having adapted a well-cooled condenser, apply the heat of a water bath until the reaction has fairly set in.

Now remove the source of heat until distillation begins to slacken, when it is gradually reapplied until the reaction ceases, or about 8 fluidounces distillate are obtained.

Instead of washing the distillate with water, I think it preferable to rectify it, as Squibb does, from carbonate of potassa, then after assay it can be diluted with alcohol so as to contain exactly the requisite amount of ethyl nitrite.

LABORATORY ELI LILLY & Co., July 8th, 1890.



Richter's Tablet Machine.

A NEW MACHINE FOR MAKING TROCHES, ETC.

MR. J. M. RICHTER, of Gratz, has devised a new machine for making troches, pastilles, etc., in which he endeavors to overcome the drawbacks inherent to the other existing machines which he has had experience with. The machine is constructed of iron and steel, and those parts which come in contact with the compressed material are nickel plated.

The advantages of this machine are said to be the following: 1. The whole action of the press, excepting only the filling of the moulds with the powder to be compressed, is performed by the movement of the lever. 2. The upper press plate always fits exactly and automatically over the mould plate. 3. The moulds or forms are easily filled by the workman without changing his stand, as the mould plate is revolvable. 4. Both upper plate and mould plate are easily removable when required to be cleaned. 5. Various sizes of troches may be turned out by the same machine; the normal sizes are 5, 10, and 15 Mm. ($\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ inch) in diameter. 6. The mould plate revolves automatically after every pressure; it only takes ten seconds to turn out 10 pastilles. 7. A chief advantage is that entirely dry powders, without any excipient or binding material, may be formed into handsome and hard troches—an important feature for the dispensary department.

The pressure exerted by the stamp is equal to 50 atmospheres (750 lbs.). If desired, the stamps may have engraved designs, names, etc.

The price of this machine (for which a patent has been applied for) is very moderate (60 florins; in case, complete, 78 florins) considering its solid and neat construction. It may be put on any kind of a table, and would serve as an ornament besides to any pharmacy.—After *Pharm. Post*.

ANOTHER pastille machine, which would seem to be of French construction, and which is adapted for operating on larger quantities of material, is shown in the annexed cut. The mass is fed upon the table and passes under a roller, after which the cutter-bar, armed with five cutters, gives the requisite shape. Beyond the cutters the pastilles fall through a hopper upon an endless belt, which returns them towards the operator. The *British and Colonial Druggist*, to which we are indebted for the illustration, does not mention the maker.

Ammonia for Pungents.—W. W. Bartlet, at a recent meeting of the Massachusetts Pharmaceutical Association, gave the following formula as a very desirable one:

Take of	
Powdered Chloride of Ammonium.....	12 3
Powdered Carbonate of Potassium.....	14 "
Powdered Camphor.....	1 "
Coarse powdered Carbonate of Ammonium..	8 "
Oil of Cloves.....	10 drops.
Oil of Bergamot.....	10 "

Mix.

Notes on Albumen and Peptone.*

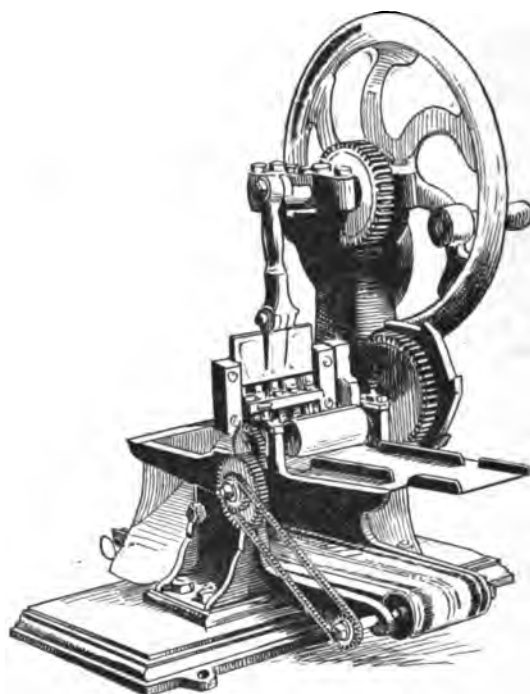
IN view of the very conflicting statements afloat in text books representing the various stages of the evolution of the science as attained to-day, and the many perversions of truth perpetrated and promulgated occasionally in the periodic press, about the behavior, the reactions and changes of albumen, and in view of the consequent misconceptions of even professional chemists and manufacturing men who manipulate this article, amply evidenced by the constantly recurring misapplied wrongful statements and *corpora delicti* furnished by the manufacturing class, it will be advisable to detail such properties of albumen and its changes as come under the conditions and within the scope of this treatise. It is, however, to be understood that the albumen was taken as it is found in nature, without any attempt to purify it and thereby change it to something with which no one else might be familiar.

1. Native egg albumen contains 14 to 15 per cent of dry albumen, which in its turn contains some $\frac{1}{4}$ to 5 per cent of ash, which is largely responsible for the condition and reactions of this native albumen. It is slightly alkaline, which causes it to produce small precipitates in neutral solutions of iron salts, its quantity being sufficient to precipitate about ten times its weight of dialyzed iron so completely that neither albumen nor iron is found in the remaining fluid.

2. If a solution of egg albumen be mixed with about $\frac{1}{4}$ per cent of hydrochloric acid (0.5 per cent HCl) it is transformed into acid albumen, or syntonin. Heat does not coagulate this solution, but addition of alkali to the neutralization point causes a precipitate of a derivate of albumen insoluble in water, called protein.

This protein is soluble with ease in either very dilute acids or alkalies, again forming salt-like combinations with them. By heating the undissolved precipitate to 80° C. it becomes insoluble in dilute alkalies, and still more so in dilute acids, and is now identical with the coagulated albumen obtained by boiling native albumen.

3. If caustic alkalies in small amounts be mixed with solutions of albumen, or if coagulated albumen be dissolved by alkali, it is transformed into alkali albumen. This likewise is not coagulable on boiling, but protein, identical with that obtained from acid albumen, is formed by neutralization by acid. A surplus of acid will



Troche Machine.

bring the precipitate again in solution, when acid albumen is formed. This change from alkali to acid albumin may be effected many times in the same solution until accumulation of salt interferes.

But if a solution of albumen be mixed with a larger amount of alkali, a precipitate occurs on neutralization which is readily soluble in dilute alkalies, but not in dilute acids.

A precipitate of the same behavior is also obtained if a solution of albumen be mixed with a solution of a heavy metal, when, on neutralization, a compound of the albumen with the metallic base is formed, which is easily soluble in dilute alkali, but not in dilute acids, unless the metallic salt be largely predominating in the mixture before precipitation is effected. Neither this nor the reaction previously mentioned is explainable if the egg albumen were a homogeneous mass. But, as in neither of the two cases the entire quantity of albumen is acted upon,

* Extract from a paper entitled "Albuminate of Iron and its Preparations," by Dr. ADOLPH TAREFF, read at the annual meeting of the American Pharmaceutical Association at Old Point Comfort, Va. See October number, p. 194

this differential reaction may be due to separable constituents of the proteidal aggregate as found in egg albumen.

4. If very finely coagulated albumen, especially that obtained by heating acidulated solutions of albumen with alkali chloride, be subjected to peptic digestion under favorable conditions, it is dissolved almost at once. This solution contains acid albumen, which differs in no way from that obtained from native albumen directly. If the albumen was less finely divided, if the conditions were less favorable or the solvent power of the pepsin too low for rapid solution, then the liquid may contain a considerable proportion of the more advanced products of digestion before all the albumen had time to be dissolved, due to the simultaneous action of the pepsin on the albumen already dissolved.

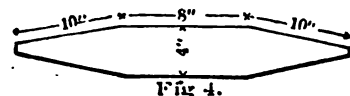
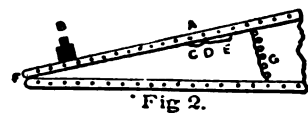
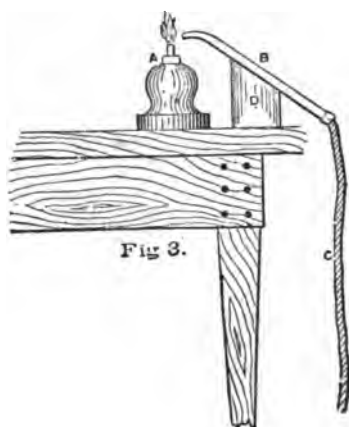
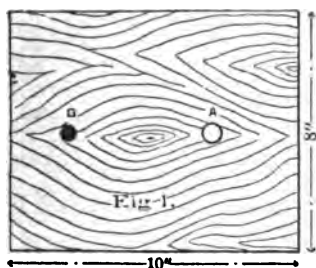
5. If the digestive action be continued on the dissolved albumen after a lapse of time, the solution may be found to respond less promptly to the reaction of alkalies or acids. Nitric acid in the cold will produce a precipitate which dissolves again on warming, while previously the precipitate obtained would fail to do so. The albumen has now been changed to a derivative called hemialbumose, or propeptone. Though less distinctly, it still yields neutralization precipitates, and enters into precipitable combinations with heavy metals, including iron, soluble in alkali. Hemialbumose, like all the previous forms of albumen, is not diffusible.

6. By prolongation or more or less duration of the same conditions and influences the final product of peptic digestion is reached—the albumen is peptonized. While

A FOOT-POWER BLOWPIPE.

TINNERS very often use the blowpipe in doing small soldering jobs, etc., and some experience great difficulty in holding their work, or in keeping the blowpipe steady and in the right portion of the flame to produce good work. I did, and therefore hope my method may be of use to some one who reads this. I first made some bellows. Figs. 1, 2, and 4 will explain how I made them. Take two pieces of wood $\frac{1}{4}$ inch thick, each 8 by 10 inches. In top one bore two holes—one, at A, 1 inch in diameter, and one, at B, $\frac{1}{4}$ inch in diameter. At B glue a circular tapering block of wood with a $\frac{1}{4}$ -inch hole through the centre. Into this hole drive firmly a small piece of brass tube, the inside measure of which should be $\frac{1}{4}$ inch. On the other side of the board, at A, Fig. 1, fix the clapper to the bellows, D, Fig. 2, which is a piece of thin wood about 2 inches square, with a piece of soft leather glued on the side next the board. Another piece of leather, C, serves as a hinge, and a string, E, fastened one end to the clapper and the other on the board, serves to keep the clapper from dropping down too far.

Should any tinner not understand the making of bellows, it is perhaps necessary to say that there must be a little drop on the clapper, as it is desirable to have it shut immediately after the pressure is put on. Two spiral springs are then fastened at G to keep the bellows always open.



Foot-power Bellows for Blowpipe.

all the previous derivatives retain more or less of the properties of the original albumen itself, an essential change has been brought about by this final transformation.

Peptone is diffusible, and its reactivity with bases has been so diminished that neither alkalies nor most of the heavy metals, except a few of the higher order, form precipitable compounds. With iron, peptone forms no compounds.

All the derivatives of albumen, except peptone, can be precipitated by saturating their acid solutions with sodium chloride or the sulphates of magnesium or sodium. Peptone thus treated is not affected, but forms a similar precipitate with the much more soluble ammonium sulphate, which reaction has been accepted as the distinguishing test for its estimation and separation from the rest of the other albumen derivatives, especially also for its separation from the extractive matter left in the final solution.

Peptone is precipitable by alcohol in neutral solution only. If acid or alkaline reaction prevail, no precipitate appears. The same property is also shared by albumen itself, and demonstrates that the affinities for alkalies or acids are not entirely lost in peptone.

Contrary to widespread belief, peptone has no color test of its own. The so-called biuret reaction claimed for peptone belongs to albumen itself, and is only intensified by its passage to peptone.

Antiseptol.—Under the name "antiseptol" M. Yvon recommends cinchonine iodosulphate as a substitute for iodoform (*Répertoire*, August 10th, page 357).

It may be prepared by dissolving 25 Gm. of cinchonine sulphate in 2 liters of water, and precipitating this with a solution of 20 Gm. of potassium iodide and 10 Gm. of iodine in 1 liter of water. The light, voluminous, kermes-brown precipitate that is produced is described as being inodorous, insoluble in water, soluble in alcohol and in chloroform, and as containing 50 per cent of iodine.

[*Note by Ed. Amer. Drugg.*—It may be of interest to state here that the late Mr. P. Casamajor, a short time before his premature death, had succeeded in obtaining an iodine derivative (di-iodide) of cinchonidine, which was found to possess strong aseptic powers. It was intended to put this on the market, but his death seems to have ended the matter.]

A strip of leather is nailed across the ends of the two boards, at F, for a hinge, and another piece of leather, shaped like Fig. 4, tacked around the edges, closing everything in. The tacks should be driven close together and the leather drawn tight.

Sheepskin is a good leather to use, or, if the tinner cannot spend the time to make them, he can, of course, use an ordinary pair.

Now, on the bench where you work is fastened a piece of wood shaped like D, Fig. 3. The shape of this block depends on the style of blowpipe you use, and any tinner will at once see what he needs.

The blowpipe B is then fastened on the incline or slant by two wire staples, and is connected with the outlet of the bellows at B, Fig. 2, by a small rubber tube when it is complete. If the bellows are made light, and the clapper adjusted properly, a fierce heat can be kept up. Once you get this fixed up you would not be without it on any account. It is always ready for use, and comes in handy for all sorts of odd jobs.—*Scient. Amer. Suppl.*

[The Fletcher blower is not expensive, and will prove a much more efficient source of air under pressure for those who have occasion to use it. Moreover, it supplies a continuous blast instead of an intermittent one, as is the case with the bellows here described.—ED. AMER. DRUGGIST.]

Lozenges for Dryness of the Throat and Mouth.—Dr. Solis Cohen states that he has used with much satisfaction for the relief of the uncomfortable sensations of heat and dryness which characterize many acute and chronic affections of the mucous membrane of the mouth and throat, a lozenge made according to the following formula:

Fluid Extract of Pyrethrum.....	$\frac{1}{2}$ minim.
Pilocarpine Hydrochlorate.....	$\frac{1}{2}$ grain.
Pure Extract of Licorice.....	2 grains.
Powdered Acacia.....	2 "
Glycerin.....	1 minim.
Sugar.....	enough to make 20 grains.

The lozenge is allowed to dissolve in the mouth, and one is used every two, three, or four hours, as necessary; the quantity of pilocarpine should be reduced. The addition of 2 grains of ammonium chloride will often be beneficial in subacute inflammatory conditions of the mucous lining of the respiratory tract, while in more chronic affections 2 or 3 minims of the oleoresin of cubebs will serve a good purpose.—*Therap. Gaz.*

Curacao Aloes and Its Preparation.

THE Curacao aloes of commerce is produced principally in the three islands of Curacao, Aruba, and Bonaire, Dutch possessions in the Caribbean Sea, north of the coast of Venezuela. The majority of the plants belong to the *Aloe vulgaris* species, although it is probable that occasionally the *Aloe spicata* is also met with; but, even if that is so, no distinction is made between the two plants by the juice manufacturers, and both are boiled down together. In 1885 a few young plants of the East Indian *Aloe Socotrina*, which yields a juice of much higher commercial value than *Aloe vulgaris*, were purchased from one of the German botanical gardens through the intervention of Professor Suringar, a well-known Dutch scientist, and forwarded to Aruba with a view of acclimatizing the Socotrine variety there; but the experiment failed completely, as most of the plants perished during the voyage, and the residue met a similar fate shortly after their arrival.

It is not improbable, however, that fresh efforts will be made in course of time to improve the species, and this is an absolute necessity if the industry is to be maintained, for at present the market value of the common Curacao aloes juice has fallen to such a point that in many cases the proceeds are not sufficient to pay the wages of the laborers who cut the plant. Mr. Holmes is of opinion that *Aloe Perryi* [the source of Socotrine aloes] would be the most suitable species to employ for the improvement of the Curacao aloes.

The principal commercial use of Curacao aloes was in dyeing, especially in the preparation of Bismarck brown. That color, however, is by no means so much in demand now as it used to be, and as in medicine Curacao aloes is used only for veterinary purposes, the demand has naturally ceased to keep pace with the supply.

There is scarcely a culture which requires less trouble and skill than the propagation of Curacao aloes. The soil need only be cleared of trees and shrubs to be ready for planting.

Manuring is unnecessary, and there is no need of fencing the plantation, as the only animals from which the young plants have anything to fear are pigs, which are apt to dig up the roots.

The plants are set out in rows, between which a space about two feet is left open. They grow everywhere, even in the most rocky soil, with remarkable facility. The plants yield their juice after the rainy season, and they are propagated from the young shoots, which sprout up all around the parent plant, and are sold by the thousand. It does not appear that the plants are ever propagated from seed. The flower of the aloes growing in Curacao is of a yellow color, while that of the Socotrine aloes is red. Mr. Van Koolwyk, a gentleman who lived in the Dutch West India Islands for many years, gives the following account of the collection and preparation of the aloes juice.

The plants are cut some time after the rains have ceased, as the juice is too thick during the dry season and too watery immediately after the rains. The aloes plant is about 18 inches high, and its leaves spread in all directions. In the island of Bonaire the plants are cut by women, who gather the leaves at the top with one hand, while with the other they give a deep circular incision at the base of the crown, thus lopping off all the larger leaves, but leaving a few young shoots to sprout afresh.

In Aruba, on the other hand, where the work of cutting is done by men, the entire crown is cut away. In various parts of the aloes field, within easy reach of the cutters, are placed wooden troughs. The cut leaves are placed perpendicularly in the trough, and a small tin receptacle is put at the opening.

The tins used for this purpose are generally empty butter or lard tins, those commodities being imported in the West India Islands from the United States. A brown-colored juice flows abundantly from the leaves without any further manipulation, and the tin, when full, is emptied out into a wooden cask. The dry leaves are thrown away or used as cattle food.

In some of the fields there is a brick-built furnace provided with a large copper boiler, into which the contents of the cask are emptied and boiled over an open fire under constant stirring. While still hot the boiled juice is poured into the wooden cases in which it is shipped to the States and Europe. Aloes boiling is perceptible at a long distance by the peculiar odor given off by the juice, an odor which is popularly reputed to be very conducive to health. In many cases the field possesses no furnace, and the juice has to be carted to a common boiling place. One of the largest of these works is situated in the neighborhood of Oranjestad, the capital of Aruba. Here the operation is done by steam, and not over an open fire as in the fields. The proprietor of these works makes a certain charge for boiling, and occasionally he purchases the raw juice on his own account, and leaves it unboiled until a large supply has accumulated. While the aloes market was yet in a more satisfactory condition, carts were sent out from the works to collect the juice in the fields; but that is not done now. The method of making incisions in the leaf and evaporating the juice in the sun, described in certain handbooks, is never followed in the

Dutch Indies, as it takes much more time than that actually in use, while the quality of the juice obtained is not necessarily superior. The produce of the islands of Bonaire and Aruba is shipped to Curacao, the principal island of the group, and its trading centre. Hence the drug is only known as Curacao aloes, although the output of the island of Curacao itself is insignificant, the yield being:

	1885	1886	1887
	Kilos.	Kilos.	Kilos.
In Curacao...	2,080	500	2,075
In Bonaire...	5,821	18,640	189,925
In Aruba.....	128,115	158,011	

—Chem. and Drugg.

Cassia Oil.

IN view of the systematic adulteration, by means of colophony, of cassia oil by China merchants, some remarks by Hirschsohn in the *Pharmaceutical Zeitung für Russland* are of special interest. Pure cassia oil, he says, dissolves in three times its volume of 70 per cent alcohol to form a clear solution, but as little as 5 per cent of colophony added to the oil suffices to make the solution opalescent, and the opalescence increases in density as the percentage of resin is increased. By heating to, say, 20° C., the turbidity diminishes somewhat. All the commercial adulterated specimens gave milky solutions with the alcohol. Another reliable test is based on the solubility of essential oils in petroleum ether, a fluid which does not dissolve resin. Cassia oil dissolves completely in 3 volumes of petroleum ether, specific gravity 0.650, and if 1 volume of the oil be shaken with 3 of the ether in a graduated tube, other essential and fatty oils, resin and kerosene, if present, will separate, and the amount may be read off. The ethereal solution of the oil, shaken with oxyhydrate of copper for a minute, and filtered, should not acquire a green or blue color, which it would have if the oil contained either colophony or resin.

Chinese Cinnamon.

It is generally supposed that Chinese cinnamon is the same thing as cassia, but there is reason to believe that this is not the case. One day I noticed our Chinese manager take a piece of bark out of his pocket, cut a bit off, and put it in his tooth. He explained that it was cinnamon, and that it was used to stop his toothache. I looked at the bark and asked him if it was not cassia he meant. He smiled complacently and remarked: "One does not pay \$5 an ounce for cassia." I have since investigated the matter, and although unable to identify the "Chinese cinnamon" plant with Ceylon cinnamon, owing to the impossibility of obtaining the flowering branches, the results of my inquiries tend to show that Chinese cinnamon differs very materially from ordinary *Cassia lignea*, if only in the fact that it is certainly obtained from very old wild trees, whereas the cassia of commerce is obtained from cultivated trees only (Ford).

I found the six samples I worked on, and which I have sent to Mr. Holmes for further investigation, to differ from cassia in appearance, taste, and smell, and to contain little or no mucilage.

On the other hand, the iodine test gave a similar reaction to cassia. Owing to the costly nature of the bark I was able to experiment only on very small quantities.

The Chinese call their cinnamon bark by different names, and pay more in some cases for an ounce of "cinnamon" than for a picul (133½ pounds) of cassia.

A cold aqueous infusion of all six samples yielded with iodine a bluish-black coloration, but with HgCl₂ there was no evidence of the presence of mucilage. The aroma of all six came near that of Ceylon cinnamon, but in some cases there was a pungency more consistent with the idea of their being derived from cassia. One important point, however, I have been able to ascertain is that "Chinese cinnamon" grows wild in Annam much further south than the West River in the Kwangsi and Kwangtung provinces, where cassia is cultivated.

The Chinese adopt the common name of *kwei* for both cinnamon and cassia, but distinguish the two by an additional name—for instance, ordinary cinnamon is *Jan kwei* and ordinary cassia *Kwei pi*.

Chinese cinnamon is never exported, owing to the heavy prices the Chinese pay for it. There are a good many varieties, all of which grow wild in Annam, in the neighborhood of a mountain there called Ching Fa.

The most expensive kinds come from the mountain itself, and are obtained from trees one or two hundred years old. It is said that trees of this age emit a fragrance. The size of one of these trees is from 20 to 50 feet high, and 4 to 5 feet in circumference. Annamites who go in search of these trees usually carry provisions to last for two months.

Owing to the enormous price the Chinese pay, the trees are denuded of their bark and consequently die. *Ching Fak wei*, so-called because it comes from the Ching Fa mountain, is the best kind, and its cost is about \$25 an ounce. Chinese doctors say this kind of cinnamon is good for curing and purging disease of the lungs and kidneys, inflammation of the eyes, convulsions in children, toothache, etc.

When a piece has actually cured a dangerous disease it is called *Shan kwei*, or God's cinnamon, and is held to be invaluable by the Chinese, and if procurable costs from fifty to one hundred times its weight in silver.

Foo kwei (bitter cinnamon) and *Ye kwei* (wild cinnamon) are also obtained from the same mountain. An infusion of the former is colorless and bitter, while that of the latter gives a sweet taste and imparts a dark red color to the water.

All the above kinds are very scarce.

Ngoi Ho Kwei.—A very good kind, obtained from hills close by the above-named mountain. It is readily procurable at Chinese druggists' shops, and costs from \$5 to \$7 an ounce. Chinese doctors generally prescribe this kind for sickness.

Ko Shan Kwei.—This is an inferior kind of cinnamon, and is an article of trade; cost, 50 cents to \$3 a catty.

All the samples sent to Mr. Holmes are strongest in flavor in the liber, or endophloeum. The liber of this drug, in fact, agrees with Ceylon cinnamon. The remarks already made on the subject by various authors may be here summarized:

Wells Williams, in his "Chinese Commercial Guide," under the head of "Chinese Imports," gives the following: "*Cinnamon (Jan kwei)*—A little is imported into the northern provinces, where none of the cinnamon or cassia trees grow. Cochin China produces both these plants, and the true cinnamon has long been sent thence to China both by vessels and travelling traders across the frontier."

Stillé and Maisch (page 476): "A kind of Chinese or Saigon cinnamon, of late occasionally met with in more regular unscrapped quills, yields a darker colored powder (than cassia), but has a very sweet and warm cinnamon taste. Its histological structure is very similar to Ceylon cinnamon."

"Pharmacographia" (pages 528-530): "China cinnamon of 1870 comes still nearer to Ceylon cinnamon, except that it is coated. A transverse section of a quill not thicker than 1 Mm. exhibits the three layers described as characterizing that bark. The sclerenchymatous ring is covered by a parenchyma rich in oil ducts, so that it is obvious that the flavor of the drug could not be improved by scraping."

The expedition of Lieut. Garnier for the exploration of Cochin China found cassia (?) growing wild in about north lat. 19°.

Dr. Thorel also states that it grows in a wild state in the forests of Cochin China. Ford, in his West River expedition, 1882, says C. cassia was not met with anywhere in a wild state, nor could any native be found who knew where it did grow wild.

Dumoutier's "Essai sur la Pharmacie Annamite" mentions both the bark of cinnamon and cassia.—HENRY HUMPHREYS (of Hong Kong) in *Pharm. Journ.* (August 16th).

Atropamine.

ATROPAMINE is the name given by Dr. O. Hesse to a new alkaloid which he has found in not inconsiderable quantity in belladonna root (*Pharm. Zeit.*, July 30th, p. 471). It is described as being at ordinary temperatures a colorless, tolerably hard varnish, but liquid at 60° C.; and as being precipitated from its salts by ammonia, or caustic potash or soda solution, as an oil, dissolving readily in alcohol, ether, and chloroform. The composition is represented by the formula $C_{17}H_{21}NO_3$, and differs, therefore, from that of atropine, hyoscyamine, and hyoscyne in containing 1 mol. of H_2O less. It has the same formula as pure belladonnine, but differs from that alkaloid in forming beautifully crystalline haloid salts, which form a ready means of separating it from all the other belladonna alkaloids.

Atropamine is optically inactive, and, what is of more importance, a 2-per-cent solution has no mydriatic action. It is only after boiling for a long time in alcoholic baryta that it is split up into tropine and an acid that is neither tropic, atropic, nor isatropic acid. The same decomposition takes place when hydrochloric acid is used, but there is a previous rearrangement of the molecule to form belladonnine. The alkaloid is, however, very delicate toward mineral acids in excess, especially hydrochloric acid, and this is thought to be the cause of its having been hitherto overlooked. The crude acid resulting from the decomposition, when treated with potassium permanganate, sometimes gives off a distinct odor of oil of bitter almonds, which seems to indicate that under certain conditions it is converted into cinnamic or isocinnamic acid. This seems the less improbable since in a normal decomposition of atropamine the acid split off would have the same composition as those acids.—After *Pharm. Journ.*

NEW AND IMPROVED FORM OF BUNSEN'S BURNER.

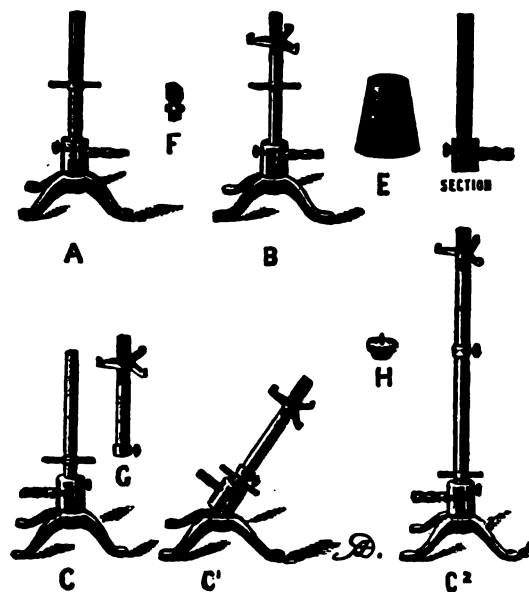
At a recent meeting of the Society of Chemical Industry, Mr. J. R. Griffin exhibited some new forms of Bunsen's burner.

The first (A) was the invention of G. Reimann, of Berlin, English patent 20,744 of December 24th, 1889. The others were modified forms of Reimann's lamp made by Mr. Griffin's firm (J. R. Griffin & Sons) at the suggestion of Mr. Watson Smith and with the consent of Herr Reimann.

Briefly it may be stated that in this new lamp the novelty is the simultaneous and corresponding regulation of the admission of gas and air to Bunsen burners. To this end, the short vertical tube or jet used in ordinary Bunsen burners for the admission of gas into the outer tube (the lamp) is dispensed with, and the burner, or outer tube, is made to act as a regulating cock for gas and air both.

In order thus to serve as a regulating cock, the extremity of the burner tube tapers to a conical shape, and is ground so as to fit the tube forming the base of the lamp and containing the air-holes, so as to form in it a kind of plug cock, as a stopper does in the neck of a bottle.

The gas enters the piece of metal tube fixed at right



Modified Bunsen's Burner.

angles to the burner tube, but at its extremity directly enters the burner by a horizontally disposed orifice, which, on turning the burner tube, is gradually closed. This arrangement obviates the objectionable "firing back" of the flame when the supply of gas is reduced. Mr. Watson Smith's additions consist (1) in a telescope tube, G, fixed around the burner tube of the ordinary lamp C, the effect being to make possible the raising or lowering of the position of the lamp flame at will (vide C'); (2) in a hinge arrangement at the base, such that the lamp tube may be inclined at any angle, as at C', or placed in a perfectly horizontal position if desired; (3) in a cylindrical brass perforated shield placed around the base containing the air-holes, so that by revolving this the air-holes are either gradually or entirely opened, as the case may be, and with ease; and (4) in the addition of a gallery with chimney E for protecting the flame. No. 2 addition is most especially useful in the process of soldering, or in the burning of filters over glazed paper in gravimetric analysis, etc.

The telescopic arrangement (No. 1) is found very useful in fractional or ordinary distillations.—*J. Soc. Chem. Ind.*

Cold Cream from Cottonseed Oil.—At the recent meeting of the Pennsylvania Pharmaceutical Association, Mr. W. L. Cliffe submitted the following formula for making cold cream from cottonseed oil:

Cottonseed Oil	15 oz.
Spermaceti.....	3 1/2 "
White Wax	3 1/2 "
Oil of Lavender.....	12 drops.
Rose Water.....	7 oz.

Cottonseed oil being somewhat of a drying nature, it was at the meeting questioned whether it was as well adapted for cold cream as the non-drying almond oil. Attention was called to the fact that the expressed oils of peach and apricot kernels are sometimes sold as almond oil, and that they are closely analogous to the latter, but may be distinguished from it by producing a reddish color on being warmed with diluted nitric acid.

Method of Taking Specific Gravity.

A CONVENIENT method of taking the specific gravity of wax, resin, or solid fat is given by Mr. Gawalowski (*Pharm. Zeit.*, July 9th, p. 427). It consists in placing a weighed piece of the substance, cut or cast into the form of a cylindrical rod about 1 to 1.5 Cm. long and 0.5 Cm. in diameter, into a dry, narrow-necked bottle of known capacity up to a mark in the neck. Water is then added from a graduated burette at a temperature of 15° C. until the mark is reached, when the quantity of water required having been noted, the specific gravity can be calculated according to the formula—

$$\text{spec. grav.} = \frac{A}{W - w}$$

where A represents the absolute weight of the substance taken, W the capacity of the bottle, and w the quantity of water. Thus in a case where the sample weighed 0.624 Gm., the capacity of the bottle 25 C.c., and the water required 24.3 C.c., the equation would be

$$\frac{0.624}{25 - 24.3} = \frac{0.624}{0.7} = 0.891 \text{ spec. grav.}$$

—*Pharm. Journ.*

Solvent Action of Alcohol of Different Degrees of Strength upon Some Drugs used in Making Tinctures.

MR. R. WRIGHT, having in mind the absence of any attempts to ascertain the comparative value of alcohols of different degrees of strength for the extraction of the active principles of drugs, undertook about three years ago such a study, using alcohol of three or four different degrees of strength, and otherwise employing the same process. The quantity of solids taken up by each was then estimated by evaporation.

In the case of tinctures representing drugs, the medicinal activity of which is supposed to be due to the presence of one or more alkaloids, it was further proposed to attempt the comparative estimation of the amount of alkaloids in each; and this was done by processes to be described later on in this paper.

The standard tinctures were prepared in the following way: The British Pharmacopœial quantity of the drug ordered for each half-pint of tincture was taken and, where necessary, reduced to powder of the requisite degree of fineness. It was then placed in a well-corked, wide-mouthed bottle into which the spirit had been previously measured, and allowed to macerate for ten days, the bottle being shaken daily. At the end of that time the clear liquid was poured away, the marc strained and pressed, the expressed tincture added to that which had been poured off, and the whole filtered.

In the preparation of menstrua it was found most convenient to use the rectified spirit of the British Pharmacopœia, sp. gr. 0.838, and containing 84 per cent absolute alcohol, as the basis.

The rule followed in the selection of menstrua was to prepare each rectified spirit tincture with alcohol of the following degrees of strength:

- No. 1, with rectified spirit.
- No. 2, with $\frac{1}{4}$ vols. S. V. R. and 1 vol. water.
- No. 3, with 3 vols. S. V. R. and 1 vol. water.
- No. 4, with proof spirit.

In the case of the proof spirit tinctures the rule was to make each tincture with alcohol of the following degrees of strength:

- No. 1, with rectified spirit.
- No. 2, with 3 vols. S. V. R. and 1 vol. water.
- No. 3, with proof spirit.
- No. 4, with S. V. R. and water, of each equal volumes.

Of the 72 tinctures contained in the British Pharmacopœia 48 were prepared, the following 24 being eliminated:

Tinctura aurantii recentis.
benzoini composita.
camphoræ composita.
cannabis indicæ.
cardamomi composita.
chloroformi composita.
chloroformi et morphinæ.
cinchonæ composita.
ergotæ.
ferri acetatis.
ferri perchloridi.
iodi.

Tinctura lavandulæ composita.
limonis.
lobeliæ æthereæ.
nucis vomicæ.
opii ammoniata.
podophylli.
quininæ.
quininæ ammoniata.
tolutanæ.
valerianæ ammoniata.
zingiberis fortior.
kino.

In the case of compound tinctures—*e.g.*, aloes, catechu, gentian, rhubarb, and senna—the active ingredient only was taken, the British Pharmacopœial quantity being used in each case.

Another tincture which was subjected to special treatment was *Tinctura guaiaci ammoniata*. It is a well-known fact that aromatic spirit of ammonia is not the best solvent for guaiacum resin, owing to the amount of water which it contains. Two samples of this tincture were prepared, one according to British Pharmacopœial formula, the other with a menstruum composed of 18 fluid-ounces rectified spirit and 2 fluid-ounces of strong liquor of ammonia.

Of the tinctures thus prepared 1 fluidounce of the first yielded on evaporation 62 grains dry extract, whilst the same quantity of the second gave 82 grains. With regard to *Tinctura cocci* and *Tinctura croci*, which are almost exclusively employed as coloring agents, it was thought well to ascertain the coloring power of each of the tinctures. It was found that cochineal yielded its coloring principle almost equally well to proof spirit, or to a rather stronger or slightly weaker spirit than that. Saffron, however, only yields its most powerful coloring principle to rectified spirit or to a mixture of S. V. R. and water not weaker than 3 volumes of the former to 1 volume of the latter. A tincture thus made has from 40 to 50 times the coloring power of the British Pharmacopœial proof-spirit tincture.

The tinctures which are supposed to owe their medicinal properties to the presence of one or more alkaloids are those of aconite, belladonna, cinchona, conium, colchicum, hyoscyamus, opium, stramonium, and veratrum viride.

The general process adopted for the estimation of the alkaloids in these tinctures was as follows: A fluidounce of the sample was placed in a porcelain dish, 20 drops of dilute sulphuric acid added, and the spirit driven off by heating over a water bath. The residual liquor was allowed to cool, and then filtered through a plug of cotton wool, placed in the neck of a small funnel, into a separating funnel, the dish and funnel being rinsed with a little distilled water. The liquid in the separating funnel was then shaken up with two successive 10 C.c. chloroform, to free it from coloring matter soluble in chloroform. It was then rendered alkaline by adding ammonia in slight excess, and the alkaloids taken out by agitation, first with 20 C.c. and then with another 10 C.c. chloroform. The chloroformic solutions were drawn off into a tared platinum dish and evaporated to dryness over a water bath, the alkaloidal residue being reheated until the weight was constant.

The above process was applied to all the alkaloidal tinctures except those of cinchona, conium, and opium.

For those of conium a modification of the above was employed, the alkaloids being shaken out with chloroform, and the chloroformic solutions run into a platinum dish containing 20 C.c. of a saturated solution of hydrochloric acid gas in chloroform. Care must be taken that the end of the funnel tube passes beneath the surface of the chloroformic hydrochloric acid, or loss of alkaloid by volatilization will take place. The chloroform was allowed to evaporate in a current of air, the residue heated at a temperature of 70° to 80° C. until it ceased to lose weight, the alkaloids being weighed and estimated as hydrochlorates.

The alkaloids in the cinchona tinctures were estimated as follows: A fluidounce of the sample was introduced into a porcelain dish, 20 grains of recently prepared calcium hydrate were added, the whole well mixed, and the mixture evaporated to dryness. The dry residue was powdered and mixed with an equal quantity of fine washed sand, and the whole placed in an extraction apparatus and exhausted by boiling chloroform, 40 C.c. being used for this purpose. When the process was complete, the chloroformic solution was filtered from the particles of lime which had washed through, the filter washed with a little more chloroform, the chloroform driven off by evaporation, and the residue weighed.

For the estimation of the opium alkaloids the following process was followed: A fluidounce of the tincture was evaporated to small bulk, the residual liquid allowed to cool and then filtered through cotton wool into a separating funnel, the dish and funnel being rinsed out with a little distilled water and the rinsings run into the separating funnel. Ten drops of British Pharmacopœial Liquor ammoniæ were added, and the separated alkaloids taken out by shaking with two successive 40 C.c. of a mixture of equal volumes of chloroform and acetic ether. The alkaloidal solutions were then evaporated to dryness, and the residue heated over a water bath until it ceased to lose weight.

The general result of these experiments, as shown upon the tables, is to prove that some, at least, of the menstrua for British Pharmacopœial tinctures might be modified with advantage. It is quite true that, as a rule, tinctures made with a strong spirit keep better and are less liable to deposit than when made with a weaker one. In order to test the effects of keeping upon the stability of the tinctures made during the course of the author's experiments, he kept samples of each for periods varying from two to three years.

Of these, the only tinctures made with rectified spirit which show much sign of depositing are cinchona, cocci, and aloes.

On the other hand, tincture of conium and tincture of galls made with proof spirit have deposited to a considerable extent. Tincture of conium would be better made with a menstruum composed of 3 volumes rectified spirit and 1 volume water. This remains clear for an indefinite period. As for tincture of galls, the three weaker samples have all thrown down copious deposits; the rectified spirit tincture alone remaining clear and free from sediment. As rectified spirit exhausts the drug more perfectly than a weaker spirit, it would apparently be

advisable to make this tincture with a stronger spirit than the proof spirit now ordered.

Of tinctures made with rectified spirit, which are equally well made with a slightly weaker menstruum, are pyrethrum, cinnamon, asafoetida, and sumbul.

Of tinctures now directed to be made with proof spirit, which yield an equally good or better product when prepared with a menstruum consisting of equal volumes of rectified spirit and water, are quassia, krameria, senna, catechu, digitalis, jaborandi, opium, aloes, cascarrilla, and senega.

TABLE I.

Showing number of grains of extract yielded by 1 fluidounce of each sample of tincture.

Tinctura.	STRENGTH OF MENSTRUUM EMPLOYED.			
	S. V. Rect.	S. V. Rect., 4 vols.; water, 1 vol.	S. V. Rect., 3 vols.; water, 1 vol.	Proof spirit.
Aconiti.....	4.5	8.0	10.0	10.0
Arnica.....	2.5	4.0	4.0	4.0
Asafoetida.....	31.0	32.0	29.0	14.5
Cantharidis.....	.5	.5	.75	1.0
Capici.....	2.5	3.5	3.5	3.0
Cinchona.....	19.0	23.0	22.0	23.0
Cinnamomi.....	7.0	9.0	9.0	6.0
Cubeba.....	8.0	8.5	8.5	8.5
Larici.....	7.5	7.5	8.0	7.5
Myrrha.....	19.0	14.5	9.5	nil
Pyrethri.....	7.0	10.5	10.5	12.0
Sumbul.....	13.0	15.0	15.0	15.0
Veratri viridis..	5.0	6.5	7.0	7.0
Zingiberis.....	2.0	3.5	3.5	3.5

	S. V. Rect.	S. V. Rect., 3 vols.; water, 1 vol.	Proof spirit	S. V. Rect. and water equal vols.
Aloes.....	10.5	11.5	12.0	12.0
Aurantii.....	9.0	13.0	14.0	15.0
Belladonna.....	3.0	5.0	6.0	6.0
Buchu.....	6.0	11.5	12.5	12.5
Calumbe.....	3.0	7.0	8.0	8.0
Cascarilla.....	6.5	8.0	8.0	8.0
Catechu.....	45.0	49.0	50.0	50.0
Chirata.....	6.0	8.0	8.0	8.0
Cimicifuga.....	8.0	12.0	15.0	18.0
Cocci.....	7.5	15.0	15.0	15.0
Colchici.....	9.0	11.0	12.0	10.0
Conii.....	6.0	6.0	6.5	8.0
Croci.....	7.0	11.0	11.5	10.5
Digitalis.....	11.0	17.0	22.0	22.0
Galla.....	44.0	44.0	41.0	40.0
Gelsemii.....	4.5	7.0	7.0	7.0
Gentiana.....	10.5	16.5	17.0	17.0
Hyoscyami.....	18.0	16.0	20.0	19.0
Jaborandi.....	12.0	16.0	18.0	20.0
Jalapae.....	9.0	14.5	16.0	16.5
Krameria.....	21.0	20.0	20.5	19.5
Lobelia.....	7.0	10.5	11.5	14.5
Lupuli.....	7.0	8.5	9.5	10.0
Opii.....	16.0	18.0	18.0	18.0
Quassia.....	.....	.5	.5	.5
Rhei.....	14.5	17.5	18.0	18.5
Sabina.....	14.0	15.0	14.0	14.0
Scilla.....	5.5	38.0	42.0	42.0
Senega.....	16.0	18.0	18.5	18.0
Senna.....	7.5	12.5	14.0	15.0
Serpentaria.....	3.5	4.5	4.5	4.0
Stramonii.....	2.5	2.5	3.0	3.0
Valeriana.....	5.0	9.0	9.0	10.0

TABLE II.

Showing amount of alkaloid (in grammes) yielded by 1 fluid-ounce of each of the alkaloidal tinctures.

Name.	S. V. R.	S. V. R., 4 vols.; water, 1 vol.	S. V. R., 3 vols.; water, 1 vol.	Proof spirit.	S. V. R., aq. pes.
Aconiti.....	.0185	.0246	.0246	.0244	.....
Belladonna.....	.0063	.....	.0079	.0068	.0069
Cinchona.....	.1560	.1596	.1588	.1590	.....
Colchici.....	.0036	.....	.0030	.0032	.0034
Conii.....	.0375	.....	.0477	.0465	.0471
Hyoscyami.....	.0059	.....	.0053	.0060	.0062
Jaborandi.....	.0198	.....	.0360	.0454	.0516
Opii.....	.3374	.....	.3884	.4068	.4252
Stramonii.....	.0077	.....	.0104	.0091	.0062
Veratri viridis..	.0239	.0294	.0311	.0360	.....

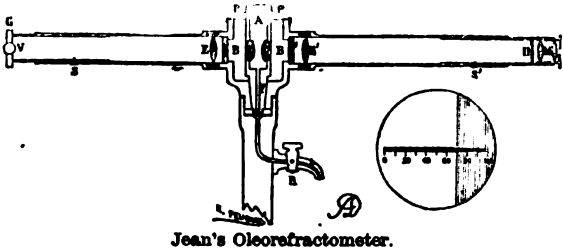
—Brit. and Col. Drugg. of September 6th, 1890.

Arsenite of Copper in Dysentery.—In the *Medical Bulletin* (August, p. 283, after *Chem. and Drugg.*) Dr. J. Swain confirms the recommendation by Dr. J. Aulde of arsenite of copper as a remedy in dysentery and allied intestinal disorders. He refers to twelve patients, varying in age from 3 weeks to 60 years, all of whom were cured. In the case of the youngest, the dose given was a teaspoonful of a mixture of $\frac{1}{16}$ grain of the salt in 4 ounces of water, a dose being given every ten minutes for one hour, and then hourly.

THE OLEOREFRACTOMETER AND ITS USES.

A new instrument for examining oils as to their identity and purity has been devised by Ferdinand Jean, of Paris. It has recently been described by Dr. Muter in the *Analyst* (May, 1890). From his report we take the following:

The analysis of oils and fats at the Paris Municipal Laboratory is practically carried out by three observations: (1) the density; (2) the thermelæometer [an instrument for taking the temperature produced when known quantities of an oil or fat and of sulphuric acid are mixed together]; (3) by the important instrument with which we are now about to deal, the construction of which will be evident on studying the drawing. The centre of the



Jean's Oleorefractometer.

instrument is formed by a circular metallic receptacle, BB, closed by two opposite lenses, EE, from which extend two tubes, SS, the one ending in a collimator, G, and the other in a short-vised telescope, M. In the middle of the receptacle is placed an inner metallic reservoir, A, having glass sides placed at a suitable angle, so as to form a prism. In front of the field glass of the telescope is a photographic scale, H, and there is also a movable vertical shutter, so placed as to divide the luminous field of the instrument into two parts, the one being quite bright, while the other is in shadow. It is the position of the edge of this shadow on the scales that determines the readings with the apparatus. If the same liquid be placed in both reservoirs, the shadow will come on the zero of the scale; but if a different liquid be placed in the inner prismatic reservoir, the shadow will come at some point either to the right or to the left of the zero, according to the nature of the refractive power of the liquid. The appearance of the shadow in the field is shown in the drawing. The illumination is obtained by an ordinary gas jet placed opposite to the collimator end of the instrument. Both receptacles are furnished with draw-off cocks, and are enclosed in an outer case (not shown in the drawing), into which water is put for the purpose of regulating the temperature, and which case is heated by a little lamp placed underneath, so as to maintain its contents at any desired degree. M. Jean has invented a typical oil that gives no refraction, and with which the outer receptacle is always filled, and the temperature is brought to 22° C. If now some more of this oil be also brought to 22° C. and placed in the prismatic reservoir, the shadow will mark zero, or if it does not do so, it is adjusted to that point by moving the shutter. The typical oil is then run out of the prism, and the oil to be tested, having been brought to 22° C., is placed therein and the reading is taken. All the vegetable oils, and some marine animal oils, deviate the shadow to the right of the zero, while the terrestrial animal oils act in the contrary sense. It takes about half an hour to regulate the instrument and get all the temperatures equal in the reservoirs, but once this is attained one sample after another can be done at intervals of five minutes, a portion of every sample of oil being used to rinse out the inner prismatic reservoir before actually filling it for observation. The following table will give some idea of the differences that can be got between the various vegetable oils:

Olive.....	+ 1.5 to + 2.
Colza.....	+ 16.5 to + 175.
Ground-nut.....	+ 4.5.
Sesame.....	+ 17.
Cotton.....	+ 20.
Castor.....	+ 40.
Linseed.....	+ 53.
Hempseed.....	+ 33.
Poppy.....	+ 30 to + 34.
Almond.....	+ 6.
Japonica.....	+ 50.

Of the animal oils and fats which go to the left we have:

Neatsfoot.....	— 8.
Horse-foot.....	— 12.
Lard.....	— 12.5.
Beef Tallow.....	— 16.
Mutton Tallow.....	— 20.
Butter Fat.....	— 35.
Margarin (average).....	— 15.
Oleic Acid.....	— 34.

Before observing any oil, it is to be, if at all rancid, shaken up in a separator with hot alcohol to remove the free fatty acids, and dried at 110° C. This is especially necessary in the examination of the lower qualities of

olive oil; and, indeed, with this particular oil it is always desirable to proceed in this manner, if a preliminary examination of the oil itself does not indicate the proper refraction.

In applying the oleorefractometer to solid fats, such as butter and lards, it is necessary to work at 45° C. The butter is first melted at the lowest possible temperature and strained through muslin. It is then dissolved in ether, and the ethereal solution is shaken up in a separator with tepid water. The solution is then transferred to a flat-bottomed flask, the ether is distilled off, and the residual fat is slowly heated up to 110° C. till quite dry. Lastly, it is cooled down to 45° C. and examined in the refractometer. Thus treated, butter gives a refraction of 35 to the left, while margarin gives an average of 15 in the same direction.

The instrument has also proved useful in the examination of methylated spirit, oil of turpentine, and will probably also prove serviceable in the examination of essential oils. It is still in its infancy, as it were, and quite expensive, costing at present some eighty dollars. It is made by Dubosq.

Alkaloidal Values of Annual and Biennial Hyoscyamus.

A. W. GERRARD, in a paper read at the British Pharmaceutical Conference, remarked that the biennial variety of henbane is believed to be more active, and stated to be so in various text books, but information on the whole was meagre, and no attempt seemed to have been made to determine with accuracy the value of the two kinds. The author's experiments extended over two years, this time being necessary in order to enable him to obtain three good specimens of each henbane. The parts examined were the leaves and tops of the annual plant, the first year's leaves and the roots of the biennial, and the second year's tops of the same plant. These were selected because, with the exception of the root, they represented the various sorts of henbane used in this country [England]. The root was taken once in August and once at the end of December, the flowering tops of the biennial plant in June and July, and the annual leaves and tops at the end of July. The method of extraction of the various parts was the same in each case. The air-dried root or leaf was placed in a large pan and dried to a constant weight. One kilogramme of the dried substance was reduced to powder, then macerated and percolated with proof spirit to exhaustion. The fluid percolated was distilled, and the residue in the retort evaporated to an extract. This was mixed and agitated with hydrochloric acid, and filtered and made up to 100 C.c. with water. For the removal of the alkaloids the solution of the former process was treated with ammonium hydrate in excess, and the liberated principles taken up with three quantities of chloroform. The mixed solution was exposed to air to allow a little ammonia to escape, and then shaken out with hydrochloric acid. After concentration of the solution of hydrochlorates fresh ammonia was added and the liquid shaken out with ether. The alkaloids were obtained in a condition partly crystalline and partly amorphous. The estimate of the bases and residue was done volumetrically by means of a solution of hydrochloric acid, and in all cases a check analysis was made. The results showed that—

First year's biennial leaf contains.....	0.6 per mille.
Second year's biennial tops contain.....	0.6 "
Annual leaves and tops contain.....	0.6 "
Biennial roots contain.....	1.6 "

This average proportion of alkaloid was made up of hyoscyamine and atropine.

From these results he gathered three important facts: (1) That annual leaves, first and second year's biennial leaves and tops have the same alkaloidal value; (2) That the first year's biennial root is much richer in alkaloids than the leaves or tops of the annual or biennial plants; and (3) That the locality and growth do not appear to have much influence on the amount of alkaloids present.

Then there were a few bearings of pharmaceutical interest. With rectified spirit the biennial root yielded an excellent extract which could be standardized readily, and the dose of which would be $\frac{1}{4}$ to $\frac{1}{2}$ that of the B. P. extract. Furthermore, it would be free from all disagreeable odor or taste. He would suggest that the biennial root and the alcoholic extract of it should be made official; the addition would be valuable, reliable, and economical compared with the present extract. With regard to the preference for biennial leaves, there seemed to be no good grounds for it; it was entirely founded upon prejudice, dependent in its turn probably upon its two years of life, its more luxuriant growth, and its selection by the pharmacopoeias. So also, with regard to therapeutical value, it was highly improbable that any difference would be found between the two henbanes. This view was supported by the fact that tinctures of the two drugs had been alternately given in the University College Hospital without any difference being discernible. If care were taken in selecting good leaves the pharmacist might depend upon the value of the products.

Mr. Holland, who had supplied some of the plants, wrote of a specimen found in a gravelly soil which flowered in the first year, as both the carrot and mangel-wurzel would sometimes do. Another wild specimen was sent by him from Bognor, in Sussex. It was small compared with the cultivated varieties. In the second year the root of the biennial henbane shrivelled up almost to nothing, but allowed to grow to December it became often as thick as a parsnip.—*Br. and Col. Drugg.*

Liquid Kino.

MR. J. H. MAIDEN lately read before the Royal Society of Victoria a paper which is quoted by the *British and Colonial Druggist*.

Angophora intermedia, D. C., the narrow-leaved apple tree, is a tallish tree, which extends from Victoria to Queensland, and is the only species of the genus which is found in the southern colony. In the following respect it is, perhaps, unique amongst Australian trees. Frequently, when an incision is made into the bark, and more particularly when the knobby excrescences sometimes found on this tree are cut, there exudes a watery liquid, which occasionally is almost as clear and as colorless as water, and at other times of an orange-brown or reddish-brown color, and of the consistence of a thin extract, or even as thick as treacle. This is doubtless the substance which was sent from New South Wales to the Paris Exposition of 1867, labelled "apple-tree juice," with the statement that it is used as a varnish; but this is not correct, as the liquid is aqueous. It is used by fishermen for tanning their nets. Mr. Kirton informed Baron von Mueller that a single tree will yield as much as 2 gallons of liquid, which is generally called "liquid kino." This is a modest computation, for the tree which yielded the Bangley Creek sample (*infra*) yielded from 8 to 10 gallons. The quantity is, in any case, by no means small, and is dependent on a variety of circumstances.

Two samples of this "liquid kino" having recently been forwarded to the Technological Museum, the author has had an opportunity of examining it.

1. From Bangley Creek, Cambewarra, N. S. W., of a clear reddish-brown color, and, in order to give precision to the tint, it is very like raw linseed oil, Strassburg turpentine, or dark balsam of copaiba, but redder than any of them. It has a specific gravity of 1.008 at 60° F., and an acidulous smell (owing to the presence of acetic acid), accompanied by an odor not so pleasant and reminding one somewhat of spent tan liquors. It deposits a quantity of sediment of a buff color, consisting almost entirely of catechin. It contains tannic acid 0.772 per cent, "non-tannin" 0.508 per cent (Lowenthal's process). The water amounts to no less than 98.3 per cent. The catechin was not estimated in this sample.

2. This was obtained from Cambewarra, but from a different locality. It is darker in color than the preceding sample, being of a rich ruby color. Like No. 1, it deposits a small quantity of sediment (catechin). This liquid kino had a specific gravity of 1.022 at 60° F. when received in April, 1888.

The following results were obtained in December to January, 1889: Tannic acid, 3.048 per cent (of the liquid kino, without evaporating); "non-tannic," 1.27 per cent (a portion of liquid kino, kept in agitation so as to obtain a fair proportion of sediment, was added to water to make up the strength of 1 grain of liquid kino to the liter); water, 96.7 per cent (after filtration from deposited catechin). The catechin and a little phlobaphene filtered off were found to be in the proportion of 0.495 per cent of the original liquid kino. Ether agitated with the filtrate took up 0.15 per cent, of which one-third was estimated to be catechin and the rest resin.

Mr. Kirton has recorded liquid kino from the Illawarra district of New South Wales, but since there appears to be no reason why it should be found in one colony more than another, it will doubtless also be obtainable in Victoria, most likely on application to fishermen.

Separation of Arsenic from Glycerin.

MR. LOUIS SIEBOLD says that he has successfully removed arsenic contaminating glycerin by precipitating it with freshly precipitated ferric hydrate. The glycerin was to be diluted with half its volume of water, and then a moderate quantity of the freshly precipitated, well-washed hydrate was to be added. These were to be stirred together, warmed, allowed to stand some hours, and filtered. The filtrate—which rapidly passed through—was free from arsenic (and also from sulphur compounds). It also contained no iron, and only required to be evaporated to the proper specific gravity; distillation was unnecessary. A second method consisted in treating dilute glycerin with a small proportion of permanganate of potassium at an elevated temperature. In this, however, redistillation was requisite.

Aristol is said to be an excellent application for piles, both external and internal.—*Western Druggist*.

The New Tariff.

WE take from the New York *Tribune* of October 2d the following portions of the present tariff which chiefly concern the drug trade. The title of the new law is "An Act to reduce the revenue and equalize duties on imports, and for other purposes." With few exceptions the language of the law is given below without change. The law provides as follows: "That on and after the sixth day of October, 1890, unless otherwise specially provided for in this act, there shall be levied, collected, and paid upon all articles imported from foreign countries, and mentioned in the schedule herein contained, the rates of duty which are, by the schedules and paragraphs, respectively prescribed."

SCHEDULE A.

CHEMICALS, OILS, AND PAINTS.

Acids.	New rate.	Old rate.
Acetic or pyroligneous acid, not exceeding the specific gravity of 1.047 per pound	1½c	2c
Exceeding the specific gravity of 1.047 per pound	4c	10c
Boric acid, per pound	5c	4 & 5c
Chromic acid, per pound	6c	15 p c
Citric acid, per pound	10c	10c
Sulphuric acid, or oil of vitriol, not otherwise specially provided for, per pound	½c	Free
Tannic acid or tannin, per pound	75c	\$1
Tartaric acid, per pound	10c	10c
Alcoholic perfumery, including cologne water and other toilet waters, per gallon and ad valorem	\$2 & 50 p c	\$2 & 50 p c
Alcoholic compounds not specially provided for in this act, per gallon and ad valorem	\$2 & 25 p c	\$2 & 25 p c
Alumina, alum, alum cake, patent alum, sulphate of alumina, and aluminous cake, and alum in crystals or ground, per pound	1½c	1½c
Ammonia—Carbonate of, per pound	1½c	20 p c
Muriate of, or sal ammoniac, per pound	½c	10 p c
Sulphate of, per pound	½c	20c
Blacking of all kinds, ad valorem	25 p c	25 p c
Blue vitriol, or sulphate of copper, per pound	2c	8c
Bone-char, suitable for use in decolorizing sugars, ad valorem	25 p c	25 p c
Borax, crude, or borate of soda, or borate of lime, per pound	3c	3c
Refined borax, per pound	5c	5c
Camphor, refined, per pound	4c	5c
Chalk, prepared, precipitated, French and red, per pound	1c	20 p c
All other chalk preparations not specially provided for, ad valorem	20 p c	20 p c
Chloroform, per pound	25c	50c
Coal-Tar Preparations.		
All coal-tar colors or dyes, by whatever name known, and not specially provided for in this act, ad valorem	25 p c	35 p c
All preparations of coal tar, not colors or dyes, not specially provided for, ad valorem	20 p c	20 p c
Cobalt, oxide of, per pound	30c	20 p c
Collodion and all compounds of pyroxyline, by whatever name known, per pound	50c	50c
Rolled or in sheets, but not made up into articles, per pound	60c	—
If in finished or in partly finished articles, per pound and ad valorem	60c & 25 p c	—
Coloring for brandy, wine, beer, or other liquors, ad valorem	50 p c	50 p c
Copperas, or sulphate of iron, per pound	1½c	1½c
Drugs, such as barks, beans, berries, balsams, buds, bulbs, and bulbous roots, and excrecences, such as nut-galls, fruits, flowers, dried fibres, grains, gums and gum resins, herbs, leaves, lichens, mosses, nuts, roots and stems, spices, vegetables, seeds (aromatic, not garden seeds), and seeds of morbid growth, weeds, woods used expressly for dyeing, and dried insects, any of the foregoing which are not edible, but which have been advanced in value or condition by refining or grinding, or by other process of manufacture, and not especially provided for in this act, ad valorem	10 p c	10 p c
Ethers, sulphuric, per pound	40c	50c
Spirits of nitrous ether, per pound	25c	30c
Fruit ethers, oils, or essences, per pound	\$2 50	\$2 50
Ethers of all kinds not specially provided for in this act	\$1	\$1

	New rate.	Old rate.
Extracts and decoctions of logwood and other dye woods, extract of sumac, and extracts of barks, such as are commonly used for dyeing or tanning, not specially provided for in this act, per pound	½c	10-20 p c
Extracts of hemlock bark, per pound	½c	10 p c
Gelatin, glue, and isinglass or fish glue, valued at not above seven cents per pound	½c	25-30 p c
Valued at above seven cents per pound, and not above thirty cents per pound, ad valorem	25 p c	25-30 p c
Valued at above thirty cents per pound, ad valorem	30 p c	25-30 p c
Glycerin, crude, not purified, per pound	1½c	2c
Refined, per pound	4½c	5c
Indigo, extracts or pastes of, per pound	½c	10 p c
Carmined, per pound	10c	10 p c
Ink and ink powders, printers' ink, and all other ink not specially provided for, ad valorem	30 p c	30 p c
Iodine, resublimed, per pound	30c	40c
Iodoform, per pound	\$1 50	\$2
Licorice, extracts of, in paste, rolls, or other forms, per pound	5½c	8-7½c
Magnesia, carbonate of, medicinal, per pound	4c	5c
Calcined, per pound	8c	10c
Sulphate, or Epsom salts, per pound	3-10c	½c
Morphia, or morphine, and all salts thereof, per ounce	50c	\$1
Oils.		
Alizarine assistant, or soluble oil, or oleate of soda, or Turkey red oil, containing fifty per centum or more of castor oil, per gallon	80c	25 p c
Containing less than fifty per centum of castor oil, per gallon	40c	25 p c
All other, ad valorem	30 p c	25 p c
Castor oil, per gallon	30c	80c
Cod-liver oil, per gallon	15c	25 p c
Cottonseed oil, per gallon of 7½ pounds' weight	10c	25c
Croton oil, per pound	30c	50c
Flaxseed or linseed and poppyseed oil, raw, boiled, or oxidized, per gallon of 7½ pounds' weight	32c	25c
Fusel oil, or amylic alcohol, ad valorem	10 p c	10 p c
Hemp seed oil and rape seed oil, per gallon	10c	10c
Olive oil, fit for salad purposes, per gallon	35c	25 p c
Peppermint oil, per pound	80c	25 p c
Seal, herring, whale, and other fish oil not specially provided for, per gallon	8c	25 p c
Opium, aqueous extract of, for medicinal uses, and tincture of, as laudanum, and all other liquid preparations of opium, not specially provided for, ad valorem	40 p c	40 p c
Opium containing less than 9 per centum of morphia, and opium prepared for smoking, per pound	\$12	\$10
But opium prepared for smoking and other preparations of opium deposited in bonded warehouses shall not be removed therefrom without payment of duties, and such duties shall not be refunded.		
Paints, Colors, and Varnishes.		
Baryta, sulphate of, or barytes, including barytes earth, unmanufactured, per ton	\$1 12	10 p c
Manufactured, per ton	\$6 72	½c pound
Blues, such as Berlin, Prussian, Chinese, and all others, containing ferrocyanide of iron, dry or ground in or mixed with oil, per pound	6c	20-25 p c
In pulp or mixed with water, per pound on the material contained therein when dry	6c	20-25 p c
Blanc-fixe, or satin white, or artificial sulphate of barytes, per pound	3-4c	25 p c
Black, made from bone, ivory, or vegetable, under whatever name known, including boneblack and lampblack, dry or ground in oil or water, ad valorem	25 p c	20-25 p c
Chrome yellow, chrome green, and all other chromium colors in which lead and bichromate of potash or soda are component parts, dry or ground in or mixed with oil, per pound	4½c	25 p c
In pulp or mixed with water, per pound on the material contained therein when dry	4½c	25 p c
Ochre and ochrey earths, sienna and sienna earths, umbers and umber earths, not specially provided for in this act, dry, per pound	½c	½c
Ground in oil, per pound	1½c	1½c
Ultramarine blue, per pound	4½c	5c

	New rate.	Old rate.
Varnishes, including so-called gold size* or japan, ad valorem.....	35 p c	40 p c *Free
On spirit varnishes for the alcohol contained therein, per gallon additional.....	\$1 32	\$1 32
Vermilion red, and colors containing quicksilver, dry or ground in oil or water, per pound.....	12c	25 p c
Wash blue, containing ultramarine, per pound.....	8c	25 p c
Whiting and Paris white, dry, per pound.....	1c	1c
Ground in oil or putty, per pound...	1c	1c
Zinc, oxide of, and white paint containing zinc, but not containing lead, dry, per pound.....	1½c	1½c
Ground in oil, per pound.....	1½c	1½c
All other paints and colors, whether dry or mixed, or ground in water or oil, including lakes, crayons, smalts and frostings, not specially provided for in this act, and artists' colors of all kinds, in tubes or otherwise, ad valorem.....	25 p c	25 p c
All paints and colors, mixed or ground with water or solutions other than oil, and commercially known as artists' water color paints, ad valorem..	30 p c	25 p c

Lead Products.

Acetate of lead, white, per pound.....	5½c	6c
Brown, per pound.....	8½c	4c
Litharge, per pound.....	8c	8c
Nitrate of lead, per pound.....	8c	3c
Orange mineral, per pound.....	8½c	8c
Red lead, per pound.....	3c	3c
White lead and white paint containing lead, dry or in pulp, or ground or mixed with oil, per pound.....	8c	3c
Phosphorus, per pound.....	20c	10c

Potash.

Bichromate and chromate of, per pound.	3c	3c
Caustic or hydrate of, refined in sticks or rolls, 1c per pound.....	1c	30 p c
Hydriodate, iodide, and iodate of, per pound.....	50c	50c
Nitrate of, or saltpetre, refined, per pound.....	1c	1½c
Prussiate of, red, per pound.....	10c	10c
Yellow, per pound.....	5c	5c

Preparations.

All medicinal preparations, including medicinal proprietary preparations, of which alcohol is a component part, or in the preparation of which alcohol is used, not specially provided for, per pound.....	50c	50c
All medicinal preparations, including medicinal proprietary preparations, of which alcohol is not a component part, and not specially provided for in this act, ad valorem.....	25 p c	25 p c
Calomel and other mercurial medicinal preparations, ad valorem.....	35 p c	25 p c
Products or preparations known as alkalies, alkaloids, distilled oils, essential oils, expressed oils, rendered oils, and all combinations of the foregoing, and all chemical compounds and salts not specially provided for, ad valorem.....	25 p c	25 p c
Preparations used as applications to the hair, mouth, teeth, or skin, such as cosmetics, dentifrices, pastes, pomades, powders, and tonics, including all known as toilet preparations, not specially provided for, ad valorem...	50 p c	50 p c
Santonine, and all salts thereof containing 80 per centum or over of santonine.....	\$2 50	\$3
Soap: Castile soap, per pound.....	1½c	20 p c
Fancy, perfumed, and all descriptions of toilet soap, per pound.....	15c	15c
All other soaps, not specially provided for, ad valorem.....	20 p c	20 p c

Soda.

Bicarbonate of soda, or supercarbonate of soda, or saleratus, per pound.....	1c	1½c
Hydrate of, or caustic soda, per pound..	1c	1c
Bichromate and chromate of, per pound.....	3c	3c
Sal-soda, or soda crystals, and soda ash, per pound.....	1c	1c
Silicate of, or other alkaline silicate, per pound.....	1c	1c
Sulphate of soda, or salt cake, or nitre cake, per ton.....	\$1 25	20 p c
Sponges, ad valorem.....	20 p c	20 p c
Strychnia, or strychnine, and all salts thereof, per ounce.....	40c	50c
Sulphur, refined, per ton.....	\$8	\$10
Sublimed, or flowers of, per ton.....	\$10	\$20
Sumac, ground, per pound.....	4-10c	8-10c

	New rate.	Old rate.
Tartar, cream of, and patent tartar, per pound.....	6c	6c
Tartars and lees crystals, partly refined, per pound.....	4c	4c
Tartrate of soda and potassa, or Rochelle salts, per pound.....	8c	8c

SCHEDULE B.**EARTHS, EARTHENWARE, AND GLASSWARE.****Glass and Glassware.**

	New rate.	Old rate.
Green, and colored, moulded or pressed, and flint, and lime glass bottles, holding more than one pint, and demi-johns, and carboys (covered or uncovered), and other moulded or pressed green and colored and flint or lime bottle glassware, not specially provided for, per pound.....	1c	*1c
Green, and colored, moulded or pressed, and flint, and lime glass bottles, and vials holding not more than one pint and not less than one-quarter of a pint, per pound.....	1½c	*1c
If holding less than one-fourth of a pint, per gross.....	50c	*1c pound.
(*30 p c when filled, exclusive of contents.)		

All articles enumerated in the preceding paragraph, if filled, and not otherwise provided for in this act, and the contents are subject to an ad valorem rate of duty, or to a rate of duty based upon the value, the value of such bottles, vials, or other vessels shall be added to the value of the contents for the ascertainment of the dutiable value of the latter; but if filled and not otherwise provided for in this act, and the contents are not subject to an ad valorem rate of duty, or to rate of duty based on the value, or are free of duty, such bottles, vials, or other vessels, shall pay, in addition to the duty, if any, on their contents, the rates of duty prescribed in the preceding paragraph: Provided that no article manufactured from glass described in the preceding paragraph shall pay a less rate of duty than 40 per centum ad valorem (old rate, 30 p c).

Flint and lime, pressed glassware, not cut, engraved, painted, etched, decorated, colored, printed, stained, silvered, or gilded, ad valorem.....	60 p c	40 p c
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All kinds of glass, cut, engraved, painted, colored, printed, stained, decorated, silvered, or gilded, not including plate glass silvered, or looking glass plates, ad valorem.....	60 p c	45 p c
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Chemical glassware for use in laboratory, and not otherwise specially provided for in this act, ad valorem.	45 p c	45 p c
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Thin blown glass, blown with or without a mould, including glass chimneys and all other manufactures of glass, or of which glass shall be the component material of chief value, not specially provided for in this act, ad valorem.....	60 p c	45 p c
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Heavy blown glass, blown with or without a mould, not cut or decorated, finished or unfinished, ad valorem.....	60 p c	45 p c
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Porcelain or opal glassware, ad valorem.....	60 p c	45 p c
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All cut, engraved, painted, or otherwise ornamented or decorated glass bottles, decanters, or other vessels of glass shall, if filled, pay duty, in addition to any duty chargeable on the contents, as if not filled, unless otherwise specially provided for in this act.		
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Unpolished cylinder, crown, and common window-glass, not exceeding 10 by 15 inches square, per pound.....	1½c	1½c
Above that and not exceeding 16 by 24 inches square, per pound.....	1½c	1½c
Above that and not exceeding 24 by 30 inches square, per pound.....	2½c	2½c
Above that and not exceeding 24 by 36 inches square, per pound.....	2½c	2½c
All above that, per pound.....	3½c	2½c

Provided, that unpolished cylinder, crown, and common window glass, imported in boxes, shall contain 50 square feet, as nearly as sizes will permit, and the duty shall be computed thereon according to the actual weight of glass.		
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Cylinder and crown glass, polished, not exceeding 16 by 24 inches square, per square foot.....	4c	4c
Above that, and not exceeding 24 by 30 inches square, per square foot..	6c	6c
Above that, and not exceeding 24 by 60 inches square, per square foot..	20c	20c
Above that, per square foot.....	40c	20c

Fluted, rolled, or rough plate glass, not including crown, cylinder, or common window glass, not exceeding 10 by 15 inches square, per square foot..	4c	4c
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	New rate.	Old rate.
Above that, and not exceeding 16 by 24 inches square, per square foot..	1c	1c
Above that, and not exceeding 24 by 30 inches square, per square foot..	1½c	1½c
All above that, per square foot.....	2c	2c
All fluted, rolled, or rough plate glass, weighing over 100 pounds per 100 square feet, shall pay an additional duty on the excess at the same rates herein imposed (the existing provision): Provided, That all of the above plate glass, when ground, smoothed, or otherwise obscured, shall be subject to the same rate of duty as cast polished plate glass unsilvered.		
Cast polished plate glass, finished or unfinished and unsilvered, not exceeding 16 by 24 inches square, per square foot.....	5c	5c
Above that, and not exceeding 24 by 30 inches square, per square foot..	8c	8c
Above that, and not exceeding 24 by 30 inches square, per square foot..	25c	25c
All above that, per square foot.....	50c	50c
Cast polished plate glass, silvered, and looking-glass plates, not exceeding 16 by 24 inches square, per square foot.....	6c	6c
Above that, and not exceeding 24 by 30 inches square, per square foot..	10c	10c
Above that, and not exceeding 24 by 30 inches square, per square foot..	35c	35c
All above that, per square foot.....	60c	60c
But no looking-glass plates, or plate glass silvered, when framed, shall pay a less rate of duty than that imposed upon similar glass of like description not framed, but shall pay in addition thereto upon such frames the rate of duty applicable thereto when imported separate.		
(The present additional duty when framed is 30 p c upon the frames.)		
Cast polished plate glass, silvered or unsilvered, and cylinder, crown, or common window glass, when ground, obscured, frosted, sanded, enamelled, bevelled, etched, embossed, engraved, stained, colored, or otherwise ornamented or decorated, shall be subject to a duty of 10 p c ad valorem, in addition to the rates otherwise chargeable thereon.		
(This is a new classification, such glass heretofore being subject to various duties.)		
Spectacles and eyeglasses, ad valorem.	60 p c	45 p c
On spectacle and eyeglass frames, ad valorem.....	60 p c	35 & 45 p c
On lenses costing \$1.50 per gross pairs, or less, ad valorem.....	60 p c	45 p c
Spectacle and eyeglass lenses with their edges ground or bevelled to fit frames, ad valorem.....	60 p c	45 p c
All stained or painted window glass and stained or painted glass windows, and hand, pocket, or table mirrors not exceeding in size 144 square inches, with or without frames or cases, of whatever material composed, lenses of glass or pebble, wholly or partly manufactured, and not specially provided for in this act, and fusible enamel, ad valorem..	45 p c	45 p c

FREE LIST.

Among the articles included in the free list are the following:

Acids used for medicinal, chemical, or manufacturing purposes, not specially provided for in this act.

Aconite.

Albumen.

Alizarine, natural or artificial, and dyes commercially known as Alizarine yellow, Alizarine orange, Alizarine green, Alizarine blue, Alizarine brown, Alizarine black. (All except Alizarine now 35 per cent.)

Ambergris.

Aniline salts.

Annatto, roucou, rocoa, or orleans, and all extracts of.

Antimony ore, crude sulphite of.

Argal, or argol, or crude tartar.

Arrowroot, raw or manufactured.

Arsenic and sulphide of, or orpiment.

Arseniate of aniline.

Articles, the growth, produce, and manufacture of the United States, when returned after having been exported without having been advanced in value or improved in condition by any process of manufacture or other means: casks, barrels, carboys, bags, and other vessels of American manufacture exported filled with American products, or exported empty and returned filled with foreign products, including shooks when returned as barrels or boxes; also quicksilver flasks or bottles, of either domestic or foreign manufacture, which shall have been actually exported from the United States.

But proof of the identity of such articles shall be made, under general regulations to be prescribed by the Secretary of the

Treasury; and if any such articles are subject to internal tax at the time of exportation, such tax shall be proved to have been paid before exportation, and not refunded. Provided, That this paragraph shall not apply to any article upon which an allowance of drawback has been made, the re-importation of which is hereby prohibited except upon payment of duties equal to the drawbacks allowed; or to any article imported in bonded warehouse and exported under any provision of law: And provided, further, That when manufactured tobacco which has been exported without payment of internal revenue tax shall be re-imported, it shall be retained in the custody of the Collector of Customs until internal revenue stamps in payment of the legal duties shall be placed thereon.

Asbestos, manufactured.

Ashes, wood and lye of, and beet-root ashes.

Asphaltum and bitumen, crude.

Asafetida.

Balm of Gilead.

Barks, cinchona or other, from which quinine may be extracted.

Baryta, carbonate of, or witherite.

Bauxite, or beauxite.

Beeswax. (Now 20 per cent.)

Bismuth.

Bladders, including fish bladders or fish sounds, crude, and all integuments of animals not specially provided for.

Blood, dried.

Bones, crude, or not burned, calcined, ground, steamed, or otherwise manufactured, and bone dust or animal carbon, and bone ash, fit only for fertilizing purposes.

Books, engravings, photographs, bound or unbound, etchings, maps, and charts, which shall have been printed and bound or manufactured more than twenty years at the date of importation.

Books and pamphlets printed exclusively in languages other than English; also books and music, in raised print, used exclusively by the blind. (Now 25 per cent.)

Books, engravings, photographs, etchings, bound or unbound, maps and charts imported by authority or for the use of the United States or for the use of the Library of Congress.

Books, maps, lithographic prints, and charts, specially imported, not more than two copies in any one invoice, in good faith, for the use of any society incorporated or established for educational, philosophical, literary, or religious purposes, or for the encouragement of the fine arts, or for the use or by order of any college, academy, school, or seminary of learning in the United States, subject to such regulations as the Secretary of the Treasury shall prescribe.

Books, or libraries, or parts of libraries, and other household effects of persons or families from foreign countries, if actually used abroad by them not less than one year, and not intended for any other person or persons, nor for sale.

Bronine.

Bullion, gold or silver.

Burgundy pitch.

Cabinets of old coins and medals, and other collections of antiquities, but the term "antiquities" as used in this act shall include only such articles as are suitable for souvenirs or cabinet collections, and which shall have been produced at any period prior to the year 1700.

Cadmium.

Calamine.

Camphor, crude.

Castor, or castoreum.

Catgut, whipgut, or wormgut, unmanufactured, or not further manufactured than in strings or cords. (Other than for musical instruments, old rate 25 per cent.)

Cerium.

Chalk, unmanufactured.

Charcoal.

Chicory root, raw, dried, or undried, but unground. (Now 2c per pound.)

Civet, crude.

Clay, common blue, in casks, suitable for the manufacture of crucibles. (Now \$3 per ton.)

Coal-tar, crude. (Now 20 per cent.)

Cobalt (now 20 per cent), and cobalt ore.

Cocculus indicus.

Cochineal.

Cocoa, or cacao, crude, and fibre, leaves, and shells of.

Coffee.

Coins, gold, silver, and copper.

Cork wood or cork bark, unmanufactured.

Cryolite or kryolith.

Cudbear.

Curry and curry powder.

Cutch.

Cuttlefish bone.

Dandelion roots, raw, dried, or undried, but unground. (Now 2c per pound.)

Divi-divi.

Dragon's blood.

Drugs, such as barks, beans, berries, balsams, buds, bulbs and bulbous roots, excrescences such as nutgalls, fruits, flowers, dried fibres, and dried insects, grains, gums and gum resin, herbs, leaves, lichens, mosses, nuts, roots and stems, spices, vegetables, seeds aromatic and seeds of morbid growth, weeds, and woods used expressly for dyeing; any of the foregoing which are not edible and are in a crude state, and not advanced in value or condition by refining or grinding, or by other process of manufacture, and not specially provided for in this act.

Eggs of birds, fish, and insects.

Emery ore.

Ergot.

Farina.

Fruit plants, tropical, and semi-tropical, for the purpose of propagation or cultivation.

Gambier.

Glass broken, and old glass, which cannot be cut for use, and fit only to be remanufactured.

Glass plates or discs, rough-cut or unwrought, for use in the manufacture of optical instruments, spectacles, and eyeglasses, and suitable only for such use; provided, however, that such discs exceeding eight inches in diameter may be polished sufficiently to enable the character of the glass to be determined.

Ice.

India rubber, crude, and milk of, and old scrap or refuse india rubber which has been worn out by use and is fit only for remanufacture.

Indigo.

Iodine, crude.

Ipecac.

Iridium.

Ivory and vegetable ivory, not sawed, cut, or otherwise manufactured.

Jalap.

Kelp.

Kieserite.

Kyanite, or cyanite, and kinite.

Lac-dye, crude, seed, button, stick and shell.

Lac spirits.

Lactarine.

Leeches.

Lemon juice, lime juice, and sour orange juice.

Licorice root, unground.

Lime, citrate of.

Lime, chloride of, or bleaching powder.

Litmus, prepared or not prepared.

Madder and munjeet, or Indian madder, ground or prepared, and all extracts of.

Magnesite, or native mineral carbonate of magnesia.

Magnesium.

Manganese, oxide and ore of.

Manna.

Manuscripts.

Marshmallows.

Metals of gold, silver, or copper, such as trophies or prizes

Mineral waters, all not artificial.

Moss, seaweeds, and vegetable substances, crude or unmanufactured, not otherwise specially provided for in this act.

Musk, crude, in natural pods.

Myrobolan.

Newspapers and periodicals; but the term "periodical" as herein used shall be understood to embrace only unbound or paper-covered publications, containing current literature of the day and issued regularly at stated periods, as weekly, monthly, or quarterly.

Nux vomica.

Oils: Almond, amber, crude and rectified ambergris, anise or anise seed, aniline, aspic or spike lavender, bergamot, cajuput, caraway, cassia, cinnamon, cedrat, chamomile, citronella or lemon grass, civet, fennel, jasmine or jasimine, jaglandium, juniper, lavender, lemon, lime, mace, neroli or orange flower, nut oil or oil of nuts, not otherwise specially provided for in this act; orange oil, olive oil for manufacturing or mechanical purposes, unfit for eating and not otherwise provided for in this act; attar of roses, palm and cocoanut, rosemary or anihos, sesame or sesamum seed or bean, thyme, origanum red or white, valerian, and also spermaceti, whale, and other fish oils of American fisheries, and all other articles the produce of such fisheries.

Opium, crude or unmanufactured, and not adulterated, containing 9 per centum and over of morphia. (Now \$1 per pound.) Orange and lemon peel, not preserved, candied, or otherwise prepared.

Orchil, or orchil liquid.

Osmium.

Palladium.

Paraffin.

Parchment and vellum.

Personal and household effects not merchandise, of citizens of the United States dying in foreign countries.

Philosophical and scientific apparatus, instruments, and preparations; statuary, casts of marble, bronze, alabaster, or plaster of Paris; paintings, drawings, and etchings, specially imported in good faith for the use of any society or institution incorporated or established for religious, philosophical, educational, scientific, or literary purposes, or for encouragement of the fine arts, and not intended for sale.

Phosphates, crude or native.

Plants, trees, shrubs, roots, seed cane, and seeds, all of the foregoing imported by the Department of Agriculture or the United States Botanic Gardens.

Plaster of Paris and sulphate of lime, unground.

Platina, in ingots, bars, sheets, and wire.

Platinum, unmanufactured, and vases, retorts, and other apparatus, vessels, and parts thereof composed of platinum, for chemical uses.

Plumbago.

Potash, crude, carbonate of, or "black salts." Caustic potash (now 20 per cent), or hydrate of, not including refined, in sticks or rolls. Nitrate of potash (now 1c per pound), or saltpeetre, crude. Sulphate of potash, crude or refined. Chlorate of potash (now 8c per pound). Muriate of potash (now 25 per cent).

Professional books, implements, instruments, and tools of trade, occupation, or employment, in the actual possession at the time of persons arriving in the United States; but this exemption shall not be construed to include machinery or other articles imported for use in any manufacturing establishment, or for any other person or persons, or for sale.

Pumice.

Quinia, sulphate of, and all alkaloids or salts of cinchona bark.

Regalia and gems, statues, statuary, and specimens of sculpture where specially imported in good faith for the use of any society incorporated or established solely for educational, philo-

sophical, literary, or religious purposes, or for the encouragement of fine arts, or for the use or by order of any college, academy, school, seminary of learning, or public library in the United States.

But the term "regalia" as herein used shall be held to embrace only such insignia of rank or office or emblems as may be worn upon the person or borne in the hand during public exercises of the society or institution, and shall not include articles of furniture or fixtures or of regular wearing apparel, nor personal property of individuals.

Saffron and safflower, and extract of, and saffron cake.

Sago, crude, and sago flower.

Salacine.

Seeds: Anise, canary, caraway, cardamom, coriander, cotton, cumin, fennel, fenugreek, hemp (now 1c per pound); hound, mustard, rape, St. John's bread or bean, sugar beet, mangel wurzel, sorghum or sugarcane for seed, and all flower and grass seeds (now 20 per cent); bulbs and bulbous roots, not edible; all the foregoing not specially provided for.

Selep, or saloup.

Skeletons and other preparations of anatomy.

Soda, nitrate of, or cubic nitrate, and chlorate of. (Now 25 per cent.)

Specimens of natural history, botany, and mineralogy, when imported for cabinets or as objects of science, and not for sale.

Spices: Cassia, cassia vera, and cassia buds, unground.

Cinnamon and chips of, unground.

Cloves and clove stems, unground.

Ginger root, unground and not preserved or candied.

Mace.

Nutmegs.

Pepper, black or white, unground.

Pimento, unground.

Storax, or styrax.

Strontia, oxide of, and protoxide of strontia, and strontianite or mineral carbonate of strontia.

Sulphur, lac or precipitated, and sulphur or brimstone, crude, in bulk, sulphur ore, as pyrites, or sulphuret of iron in its natural state, containing in excess of 25 per centum of sulphur (75c. per ton) (except on the copper contained thereon), and sulphur not otherwise provided for. (\$10 to \$20 per ton.)

Sulphuric acid which at the temperature of 60 degrees Fahrenheit does not exceed the specific gravity of one and three hundred and eighty thousandths, for use in manufacturing superphosphate of lime or artificial manures of any kind, or for any agricultural purposes.

Tamarinds. (Preserved, old rate, ad valorem, 35 per centum.)

Tapioca, cassava, or cassady.

Tar (now 10 per cent), and pitch of wood (now 20 per cent), and pitch of coal-tar (now 20 per cent).

Terra alba.

Terra japonica.

Tonquin, tonqua, or tonka beans.

Tripoli.

Turmeric.

Turpentine, Venice. (Now 20c. per gallon.)

Turpentine, spirits of.

Uranium, oxide and salts of. (Now 25 per cent.)

Vaccine virus.

Verdigris, or subacetate of copper.

Wafers, unmedicated. (Now 25 per cent.)

Wax, vegetable or mineral.

Wearing apparel and other personal effects (not merchandise) of persons arriving in the United States.

But this exemption shall not be held to include articles not actually in use and necessary and appropriate for the use of such persons for the purpose of their journey and present comfort and convenience, or which are intended for any other person or persons, or for sale. Provided, however, that all such wearing apparel and other personal effects as may have been once imported into the United States and subjected to the payment of duty, and which may have been actually used and taken or exported to foreign countries by the persons returning therewith to the United States, shall, if not advanced in value or improved in condition by any means since their exportation from the United States, be entitled to exemption from duty, upon their identity being established, under such rules and regulations as may be prescribed by the Secretary of the Treasury.

Artificial Sea Water.

PROFESSOR EDWARD PERRIER lately communicated to the French Academy of Sciences the results of some experiments made by him at the zoological laboratory of the Saint-Cloud normal school, upon the use of artificial sea water for the preservation of marine animals, and especially of oysters, in large aquariums.

The solutions employed have been reduced by him to the following formula for from 3 to 4 quarts:

Chloride of Sodium.....	81 Gm.
Sulphite of Magnesium.....	7 "
Chloride of Magnesium.....	10 "
Chloride of Potassium.....	2 "

During the exposition this solution gave as good results as natural sea water, with very much less expense.

Remedy for Roaches.

TAKE 8 pounds of oatmeal, or meal of Indian corn, and mix it with a pound of white lead; moisten with treacle so as to form a good paste, and put a portion down at night in the infested building. Repeat for a few nights alternately, and in the morning remove the paste and the corpses to a convenient place.

CORRESPONDENCE.

PATENTED PROCESSES AND REMEDIES.

To the Editor of American Druggist.

SIR:—In your September number we notice a note of American mineral waters that requires a word of explanation.

Prof. Waller states that he was unable to obtain the water from our springs. In this he does us an injustice in so far as he does not state the whole truth. Our springs are seven miles from the bottling house, and a good half-mile from any residence. Of course the building over it, containing two pumps run by windmill, and many supplies, is under lock and key while the men are absent driving the teams back and forth to the bottling house. Prof. Waller sent a man to Nashua with two sealed demi-johns for the purpose of obtaining water at the springs. When he arrived in Nashua he asked a jobber to take him to the springs, and stated that he wanted to get some water. The jobber, who happened to be in our employ, informed him that the water was sold only in cases. He then called up our bookkeeper by telephone, and, as he simply stated that he desired to buy two demi-johns of water, was told that he would have to buy in cases, as we sold no water in bulk. After calling upon the express company—and from them we afterward learned the address of the party to whom the water was to be shipped—and making some arrangement for returning the demi-johns to New York, the emissary departed, saying he would return in a day or two. Hearing nothing from him, we wrote Prof. Waller as follows:

NASHUA, N. H., May 29th, 1890.

Prof. Elwyn Waller, School of Mines, 49th st., corner 4th ave., New York, N. Y.

DEAR SIR:—We have at our factory two demi-johns or jars which were delivered here by the express company with a message from one Mr. Benedict, saying he would call here within two days and see about having them shipped to you, and left your address with the express company. Will you kindly advise what to do with them? We did not understand what was wanted, and did not see Mr. Benedict. Awaiting your reply, we are,

Yours very truly,

THE LONDONDERRY LITHIA S. W. Co.

We quote his reply:

NEW YORK, June 2d, 1890.

GENTLEMEN:—I have received a letter from you inquiring as to a couple of demi-johns which by some mistake were sent to you. Please return them to me at your convenience.

Yours truly,

E. WALLER.

LONDONDERRY LITHIA S. W. Co.,

Nashua, N. H.

On June 5th we wrote as follows, to which no reply has been received:

NASHUA, N. H., June 5th, 1890.

E. Waller, Ph. D., 50th st., cor. 4th ave., New York, N. Y.

DEAR SIR:—Yours of the 2d received. If you desire to have the demi-johns filled with our spring water to be analyzed at your school, we are perfectly willing that you should send a man (an expressman from here if you choose) to the springs, or have them filled at our factory, sealed, and expressed to you. Awaiting your reply, we are,

Yours very truly,

THE LONDONDERRY LITHIA S. W. Co.

In view of these facts we think it in bad taste—to say the least—to insinuate that the Londonderry Company has any choice in the kind of water it sends out. The water which Dr. Endemann furnished is not from our springs, as the amount of solids, 5.2, plainly shows. There has been a systematic refilling of our bottles which we have spent much time and money to detect, and it is absolutely certain that water showing no lithium was not taken from our springs. An examination of our bottling house will convince any one that the still and sulpho-carbonated waters must be just alike, aside from the chlorides which all bottlers use when charging with carbonic acid gas.

Visitors are not, as Prof. Waller states, refused admission to our springs. They have been visited by hundreds during the past summer. Any one may go there by calling at the house of the keeper and obtaining the key. As we have water to sell, and no hotel or land scheme on foot, we make no effort to give it away.

We ask you to print these facts in justice to us and the friends we have made by demonstrating the value of the water as a medicine. Very respectfully,

THE LONDONDERRY LITHIA S. W. Co.

NASHUA, N. H., Sept. 9th, 1890.

Camphor a Solvent of Iodoform.—The addition of camphor to ether or alcohol increases the quantity of iodoform it is capable of dissolving. Olive oil saturated with camphor dissolves 6 per cent of iodoform.

REFINING COCOANUT OIL. ARTHUR SMITH, Brockley, County of Kent, England. Serial No. 353,030. Patented in England March 5th, 1887, No. 3,410.

Claim.—The process for deodorizing cocoanut oil by boiling with a sulphide, washing, boiling again with a bisulphite, and washing.

SUBSTITUTE FOR IODOFORM. JOSEF MESSINGER and GEORG VORTMANN, Aix-la-Chapelle, assignors to the Farbenfabriken, vormals Fr. Bayer & Co., Elberfeld, Germany. Serial No. 339,321. Patented in Germany March 9th, 1889, No. 49,739.

Claim.—A red-brown, odorless powder derived from iodine and salicylic acid, which is insoluble in water, alcohol, ether, and oil, changing to a bright-red powder by heating it with mineral acids, and melting at about 225° C., with decomposition, and being insoluble in alkalies.

OBTAINING PEPSIN. JOHN BRILL, Philadelphia, Pa., assignor of one-third to Frederick Heim, same place. Serial No. 305,870.

Claim.—The method of obtaining pepsin, consisting in, first, taking a number of hogs' stomachs and finely chopping the same; second, in subjecting the prepared mass to the action of acid and water and beating it for about three hours; third, pressing the juice from the mass; fourth, clarifying the juice by a benzin bath, and then drying the precipitated pepsin.

MEDICATED PAPER. WILLIAM SCHULTZ, New York, N. Y. Serial No. 342,145.

Claim.—A medicated paper consisting of paper the surface of which is coated with ochre and vaseline.

DISINFECTANT. WILLIAM F. SIMES, Philadelphia, Pa. Serial No. 350,186.

Claim.—A disinfectant and moth preventive composed of naphthalene, oil of camphor, and caustic soda.

PROCESS OF PREPARING CARBONATED BEVERAGES. GEORGE C. HENRY, Burlington, Iowa. Serial No. 310,791.

Claim.—The process of preparing carbonated beverages, which consists in charging with carbonic acid gas plain water in a retort, and charging with carbonic acid gas an enriching fluid in another retort, then drawing them under pressure separately, and mixing and combining them in the same vessel to form a foamy, creamy beverage.

MODE OF PREPARING EGG SYRUP. PHILIP THORPE, New York, N. Y. Serial No. 314,067.

Claim.—The method of producing an egg syrup, which consists in dissolving sugar or saccharine matter in water subject to heat and agitation, beating eggs together apart from the sugar and water, stirring the beaten eggs into the syrup, adding bicarbonate of soda or its equivalent, and finally heating the entire mass to, or about to, the boiling point.

PROCESS OF MAKING AMMONIUM NITRATE. EUGÈNE CAREZ, Brussels, Belgium. Serial No. 306,711. Patented in Belgium August 17th, 1888, No. 82,930; in Austria-Hungary August 30th, 1888, and February 23d, 1889, No. 35,935 and No. 57,999; in Germany December 21st, 1888, No. 48,278; in France March 11th, 1889, No. 196,619; in England March 12th, 1889, No. 4,316; in Sweden March 21st, 1889, No. 2,207; in Norway March 21st, 1889, No. 1,290; and in Spain April 1st, 1889, No. 9,432.

Claim.—The process of manufacturing ammonium nitrate consists in calcining barium sulphate out of contact with air with a mixture of charcoal and resin oil (or other hydrocarbon), and boiling the product of the reaction with sulphur and water to produce polysulphide, and transforming this into barium nitrate by means of sodium nitrate, and then crystallizing and decomposing with ammonium sulphate in order to produce on the one hand ammonium nitrate, and on the other to recover the barium sulphate.

OBTAINING ACETIC ACID AND METHYL ALCOHOL. FRANK C. ALKIER, Wiesselburg-on-the-Erlauf, Austria-Hungary. Serial No. 343,542.

Claim.—1. The process of recovering the methyl alcohol and acetic acid from the waste wash-water or lye in the manufacture of paper from wood pulp, which consists in concentrating such water or lye by repeated use, neutralizing the concentrated solution by means of an alkali, recovering therefrom the methyl alcohol by distillation, and evaporating the residuary liquor to dryness, whereby the acetic acid is obtained in the form of an acetate.

2. The process of recovering the methyl alcohol and acetic acid from the waste wash-water or lye in the manufacture of paper from wood pulp, which consists in concentrating such water or lye by repeated use, neutralizing the same by means of an alkali as concentration proceeds, recovering the methyl alcohol from the concentrated solution, evaporating the residuary liquid to dryness, and obtaining the acetic acid from the acetate by distillation with an acid.

PROCESS OF OBTAINING OXYGEN FROM AIR. ARTHUR BRIN, London, County of Surrey, assignor to the Continental

Oxygen Company (Limited), Westminster, England. Serial No. 341,351.

Claim.—1. The process of obtaining oxygen and nitrogen from atmospheric air, said process consisting in heating barium oxide to a suitable temperature, as indicated, admitting air thereto until peroxidation takes place, then shutting off the air supply and deoxidizing the barium by reducing the pressure without changing the temperature of the heating chamber.

2. The process of obtaining oxygen and nitrogen from atmospheric air, said process consisting in heating barium oxide in retorts to a suitable temperature, as indicated, forcing air into said retorts under pressure until peroxidation is complete, then shutting off the air supply and withdrawing the oxygen from the peroxide by suction without changing the temperature of the heating chamber.

INSECTICIDE. FREDERICK R. FARWELL and FOSTER P. RHINES, Watertown, N. Y. Serial No. 346,007.

Claim.—An insecticide compound consisting of the extracts of water, pepper, and wormwood.

INSECTICIDE. WASHINGTON MANN, Fresno City, Cal. Serial No. 348,902.

Claim.—The composition of matter to be used for the extermination and destruction of insect pests of all kinds which live or feed upon trees of all kinds, vines, shrubs, plants, etc., consisting of one part flowers of smartweed, one part lime, and two parts sulphur.

INSECTICIDE. CHARLES C. PARSONS, Hempstead, N. Y. Serial No. 344,184.

Claim.—1. The composition of matter to be used for protecting plants from insects, consisting of a soap and the substance obtained by treating coal oil or petroleum or its derivatives or distillates with an acid, and known in the trade as sludge acid, and sufficient alkali to neutralize the acid, so that it will not decompose the soap.

2. The composition of matter to be used for protecting plants from insects, consisting of a soap and the tarry or oily substance separated from the sludge acid by diluting it with water, and sufficient alkali to neutralize the acid in the oil or tar.

3. The composition of matter, consisting of a soap and the substance obtained by treating coal oil or petroleum or its derivatives or distillates with an acid, and known in the trade as sludge acid, and sufficient alkali to neutralize the acid, so that it will not decompose the soap, and a starchy, mucilaginous, or glutinous substance.

SOLIDIFIED PERFUME. GUSTAVE H. DUBELLE, New York, assignor to Gustav A. Edler, Woodside, N. Y. Serial No. 328,481.

Claim.—1. A solidified perfuming agent, consisting of a waxy protecting material intimately mixed with orris root impregnated with a perfume.

2. A solidified perfuming agent, consisting of paraffin intimately admixed with pulverized orris root impregnated with a perfume.

3. A solidified perfume, consisting of paraffin intimately admixed with powdered orris root and a volatile perfume.

PRESERVING COMPOUND. ORANGE WILLIAMS, Milwaukee, Wis., assignor to two ninths to Charles P. Foster, same place. Serial No. 356,890.

Claim.—1. An antiseptic compound or germicide, comprising ground coffee berries, ground cinchona bark, and ground cinnamon, mixed with flowers of sulphur and pulverized sugar and potassium nitrate.

2. An antiseptic compound or germicide, consisting of water impregnated with the gases evolved from the combustion of a mixture of ground coffee berries, ground cinchona bark, ground cinnamon, flowers of sulphur, pulverized sugar, and pulverized potassium nitrate.

REMEDY FOR ASTHMA. CHARLES ISELIN and DANIEL CALAHAN, Riverside, Cal. Serial No. 346,596.

Claim.—The composition of matter to be used as a medicine for the treatment of asthma, consisting of brandy, honey, olive oil, vinegar, and rhubarb, combined in about the proportions specified.

AGUE REMEDY. JOHN W. NOLAND, Rich Hill, Mo. Serial No. 348,460.

Claim.—The composition of matter to be used as a remedy for malarial troubles, consisting of extract of logwood, bicarbonate of soda, water, sugar, alcohol, quinine, cinchonidia, hydrocyanic acid, and syrup of wild cherry, compounded substantially in the proportions specified.

REMEDY FOR DYSPEPSIA. PIERRE L. BRAULT, St. Johns, Quebec, Can. Serial No. 347,937. Patented in Canada February 8th, 1890, No. 33,639.

Claim.—The composition of matter to be used for the facilitation and assistance of digestion, and in troubles of a dyspeptic nature, consisting of water, bicarbonate of soda, extract of taraxacum, and tincture of gentian, compounded in substantially the proportions specified.

TONIC BEVERAGE. WALTER S. HICKS, Ann Arbor, Mich., assignor to the Eureka Manufacturing Company, Baltimore, Md. Serial No. 288,248.

Claim.—The medical and tonic beverage, consisting of

ale, peptonized beef, and cascara sagrada, in the proportions set forth.

SALVE. JAMES J. RYAN, Brooklyn, N. Y. Serial No. 345,103.

Claim.—The composition of matter for a salve, consisting of bloodroot, Armenian bole, rosin, lard, and Stockholm tar, in about the proportions specified.

SALVE. WALTER R. HALL, San Francisco, Cal. Serial No. 335,136.

Claim.—The composition of matter to be used as a salve, consisting of iodoform, oil cajuput, oxide of zinc, carbolic acid, and olive oil, in substantially the proportions stated.

LOTION. FRIEDRICH SCHMIDT, Brooklyn, N. Y. Serial No. 352,662.

Claim.—A medicinal compound composed of water, alum, sugar, yarrow, cloves, saffron, and plantain.

LINIMENT. WILLIAM C. SUMMERS, Forest City, Ark. Serial No. 353,625.

Claim.—The medical compound as a liniment, consisting of whiskey, camphor gum, saltpetre, spirits of turpentine, apple vinegar, spirits of ammonia, coal oil, and sweet milk, in the proportions specified.

TOPICAL REMEDY. JOHN H. BLUME and CHRISTOPHER LOVING, Walhalla, Tex., assignors to John H. Blume & Co., same place. Serial No. 341,321.

Claim.—1. The liniment, comprising fox-grape root and cottonseed oil, combined in substantially the proportions specified.

2. The liniment, consisting of fox-grape root, cottonseed oil, and sassafras oil, combined in substantially the proportions specified.

REMEDIAL COSMETIC. CAROLINE J. WILKINS, Denver, Col. Serial No. 325,714.

Claim.—The composition of matter for a remedial cosmetic, consisting of borax, dextrin, alcohol, water, extract of witch-hazel bark, and madder, in the proportions substantially as set forth.

New Test for Albumin in Urine.

A NEW albumin test has been brought forward by A. Jolles (*Zeit. analyt. Chem.*, xxix., 406). If 8 to 10 C.c. of urine be mixed with an equal volume of concentrated hydrochloric acid, and then 2 or 3 drops of a clear saturated solution of bleaching power carefully poured on top by means of a pipette, the presence of any albumin is indicated by a white turbidity at the point of contact of the two liquids. This test, by which 0.01 Gm. of albumin in 100 C.c. of urine may be detected, is not so delicate as the well-known nitric acid test, but the author suggests that by the employment of both tests and suitable dilution of the urine, a quick and easy estimation for clinical purposes of the percentage of albumin is possible. The most searching test, he considers, however, may be made with acetic acid and yellow prussiate of potash, by means of which 0.0008 of albumin in 100 C.c. urine may be detected. As the turbidity caused by this reagent may be masked in urine containing bacteria that cannot be removed by filtration, Jolles recommends that the urine be first shaken with infusorial earth, when a clear filtrate can be obtained. Since by this treatment traces of albumin may also be removed, the precipitate should be washed with warm potash solution, and the test applied to the acidified filtrate in the usual way. Dr. Venturoli proposes (*L'Orosi*, August, p. 255) that the amount of albumin in urine should be determined by titration with a 1-per-cent solution of mercuric chloride. Complete precipitation is indicated by the formation of a vermilion coloration with potassic iodide. Each cubic centimeter of mercuric solution required represents 0.0245 Gm. of albumin.

Recording of Trade Marks.—Assistant Secretary Spaulding, of the Treasury Department, has issued a circular to officers of the customs and others, calling attention to Section 7 of the new tariff law, providing that on and after March 1st, 1891, no article of imported merchandise which shall copy or simulate the name or trade mark of any domestic manufacture or manufacturer shall be admitted to entry at United States custom houses. In order to aid the customs officers in enforcing this prohibition, it is provided that a domestic manufacturer who has adopted trade marks may require his name and residence and a description of his trade mark to be recorded in books kept for that purpose in the Treasury, and may furnish to the Department fac-similes of such trade marks. The circular contains a statement showing what should be furnished in applications for the recording of names or trade marks in the Department. The application should also contain the names of the ports to which the fac-similes are to be sent. No fees will be charged for this recording. The circular says that a sufficient number of fac-similes should be forwarded to enable the Department to send one copy to each port named in the application.

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EDITORIAL.

PROPOS to the latest contributions to the "pepsin question" made by recent authors, is the suggestion that when so much can be written upon any subject it is quite likely that our knowledge of the subject is but fragmentary, and that much is purely speculative and hypothetical. For illustration of this in other branches of medicine, take cholera and rabies. The Index Catalogue of the Library of the Surgeon-General's Office at Washington has over one hundred and forty-seven pages of titles of books and papers on the former and over thirty pages of titles relating to the latter. Nevertheless we know, perhaps, actually less of a practical character about cholera than of any other zymotic disease; and considering that only one physician in several thousands has ever seen a case of genuine rabies, the literature of this subject is quite as superfluous.

AFTER all has been said and done, what is the practical outcome of the "pepsin war"?

- R Pepsini..... 3 ss.
- Sodii Bicarbonatis, Bismuthi Subcarbonatis..... 3 i.
- Capsici, Quininae Sulphatis..... 3 gr. x.
- Opii Pulveris..... gr. ijss.

M. Divide into 10 powders and mark: One to be taken a half-hour after eating. DR. A—.

This is about what the average doctor seems to consider the right thing to give a patient when there is anything wrong with his digestion, and if the case is at all serious the further advice is given to restrict the diet to milk and lime water and to take plenty of exercise. As may be anticipated, the dyspepsia usually gets worse, the patient loses appetite, strength, and flesh, and becomes low-spirited. The doctor declares that he never thought pepsin was good for much anyway, and advises his patient to travel.

UNTIL physicians abandon the practice of using pepsin in the general manner above indicated, our pharmaceutical chemists may as well spare their labor, for it makes little practical difference whether it be capable of

dissolving egg albumen or not, whether it be pepsin, pepsone, parapepsin, syntonin, mucin, pulverized mucous membrane, chicken-gizzard, sugar of milk, starch, or whatever else you please, it will serve just as well for purposes of trade and just as little as an aid to digestion. It may be a perfect marvel of digestive power, as demonstrated with boiled eggs and a test tube in the laboratory, but who can expect anything of it in the manner in which it is used?

If those who are interested in the study of pepsin want to do any further work in this direction, we suggest that they investigate the digestive power of the above mixture (which, as our memory serves us, was based upon the teaching of a New York professor, and was a stock prescription in a metropolitan hospital), and of such other forms of administering pepsin as are commonly prescribed. It would be well, too, to undertake a series of experiments with articles of food which are used rather than with substances that are never met with in the dietary of any human being; for it is of little practical value to any besides manufacturers to establish the digestive power of this hypothetical substance upon pure albumen, when fried oysters, corned-beef hash, broiled mutton chops, fried beefsteak, etc., mixed with a multitude of other things, are the substances that it is expected to dispose of. The true test of pepsin is what it will do in the stomach, not in the test tube; and under conditions such as exist in the stomach, not in the laboratory. The solution of the problem is one of clinical, not of rhetorical nature, and it is quite time that doctors who write more than they practise should suspend their labors in this field until the doctors who practise more than they write have "caught up with the procession."

WHY have we not made more advances in the official forms for our remedies? We have had a number of papers of late upon the subject of pill making, and yet the making of pills seems to be rapidly becoming a lost art, and compression and the method introduced by Dr. Fuller are to a considerable extent taking its place. It is not saying much to predict that the next generation of pharmacists will smile at refinements of the present day in the way of excipients and other pharmacal features inherent to the pill mass and the mussy combination of powdered licerice root or starch with nasty-looking, bad-smelling, and irregularly shaped pills. What is to prevent many if not most of the formulas now made by the massing process being worked in the form of a compressed tablet? The latter are in every way superior as regards convenience and appearance. The apparatus is not so expensive as to be beyond the reach of dispensers, and there is every probability that when the apparatus is known to be in the possession of dispensers and practically available, prescribers will construct their formulas so as to be capable of compression.

The apparatus required for making Fuller's tablets is of the simplest and least expensive character, and the practical difficulties to be overcome are trivial compared with some that are met with in forming a good pill mass. Nevertheless dispensing pharmacists have hardly begun to appreciate the advantages of this new form of medication, and are allowing the medical profession and the general public to acquire a belief that in the case of both compressed and triturate tablets they must depend upon the manufacturing pharmacist.

WHAT is the reason that the lozenge is not more commonly used as a form for dose administration? The majority of people who take medicine are not confined to the house, and still less to the bed, and small doses repeated at short intervals and giving a maximum of therapeutic effect are hardly possible with those who are attending to business, unless the remedy is readily portable, accurately divided, and capable of being taken without the aid of spoon, glass, or tube. The makers of proprietary preparations and manufacturers of regular pharmaceuticals seize every opportunity for appealing to the whims or opinions of their patrons in such matters of convenience and taste—what are dispensing pharmacists doing?

If physicians were to prescribe compressed or triturate tablets or lozenges, or even Limousin's *cachets*, how many dispensing pharmacists could prepare them? Even in the simple matter of dispensing ointments in collapsible metallic tubes, which can be carried in the pocket or put into a dressing bag with perfect safety, instead of putting them into a greasy gallipot or a chip box, how many are prepared with a supply of such containers?

How many are there who continue to dispense solutions for hypodermic use in vials which have necks too small to admit the syringe?

How many are there who have ever tried to make a soft gelatin capsule and to fill it and seal it?

How can prescribers be expected to prefer the products of the retailing and dispensing pharmacist rather than those of the manufacturer, when the former fails to keep up with the times and allows the manufacturer to avail himself of *all* the improvements in processes, forms, attractiveness of containers, price, advantages of advertising, etc., etc.? The retailer generally goes still further in his efforts to build up a reputation for the manufacturer at the expense of his own, by covering his walls and counters and filling his cases and windows with other people's advertisements.

To come back to the point at which we started, why have we not made more advances in the *official* forms for many of our remedies, and not left pretty much all that is recognizable as improvements to the manufacturing pharmacist? Isaac Watts is said to have remarked that he did not believe in letting the devil have all the good tunes. So, one might say, it is not good business management to allow the manufacturer to get the advantage of *all* the improved methods.

Mexico to Adopt the Metric System.—Minister Ryan, at Mexico, has informed the Department of State at Washington that the Mexican Republic will adopt the recommendations of the International American Conference in regard to a uniform system of weights and measures. "Since 1857," says the despatch, "various legal provisions have been adopted to place this (the metric) system in practice and make its use general, though up to the present it has only been employed in official business. Measures have recently been taken by the Government which will shortly eventuate in the adoption of this as the only system of weights and measures to be used in the Mexican Republic."

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,484.—**Sun Cholera Mixture** (H., Philadelphia, Pa.).

So called from its having appeared in the N. Y. *Daily Sun* during the epidemic of Asiatic cholera in New York City in 1866. It consists of equal volumes of tincture of opium, tincture of capsicum, tincture of rhubarb, spirit of camphor, and spirit of peppermint.

No. 2,485.—**Celerina** (M. C. W.).

This is a proprietary preparation stated to be prepared from celery root, coca, and Viburnum prunifolium. We believe that the Elixir Apii Graveolentis Compositum of the National Formulary is a suitable equivalent for it, possessing at least the merit of certainty of composition. The latter is as follows:

Fl. Extr. of Celery Root.....	1 fl. oz.
" " " Coca.....	1 "
" " " Viburnum prunifolium.....	1 "
" " " Kola Nut.....	1 "
Alcohol.....	2 "
Aromatic Elixir.....	enough to make 16 "

No. 2,486.—**Acme Capsule Filler** (M., Baltimore, Md.).

We do not know the address of the maker of the Acme Capsule Filler described in our August number. Our description was based on an article in the *Druggists' Bulletin*, of Detroit, the editor of which may be able to give the information.

No. 2,487.—**Headache Wafers** (W., Fort McIntosh, Tex.).

The composition of these wafers, made in Wisconsin, is not known to us, but this may be said: About the time that antipyrin, antifebrin, and phenacetin became known to possess the power of quickly relieving the neuralgic element of migraine, proprietary specifics for headache became a fashion, and there appears to be no limit to their number. If you will enclose 5 grains of antipyrin and 1 grain of antifebrin, or 8 grains of phenacetin, between two layers of the rice-flour wafers used for the administration of medicines, you will doubtless have all that these proprietary wafers contain; and by adding a mere trace of some flavor to disguise the drugs and give them an individual character, and calling them by some fanciful title, you will have just as good a "magic headache wafer" as can be found in the market. Of the two we favor the phenacetin as being the safer for general use.

No. 2,488.—**Labelling Bottles** (J. C. R., Boston, Mass.).

"Some months ago I undertook to label some bottles for stock tinctures and elixirs in oil. I painted the ground of the label with flake-white, taking particular care not to use any oil for fear of discoloring it. Now they have turned a dark cream color. Could you tell me the cause, and how I could prevent it and have a good clean white all the time?"

Flake-white is carbonate of lead made by an English process, we believe, and is ground with oil. The causes of discoloration may be: 1. White lead mixed with boiled linseed oil turns dark when excluded from sunlight, owing to some change in the oil the nature of which is little understood. 2. Even a trace of sulphuretted hydrogen in the air may darken such paint if its action is long continued.

As for the prevention, use so-called China gloss, in which we believe the oil is replaced by dammar varnish. Before undertaking another set of labels take advice from an expert painter on the use of the China gloss. We know that when it is used on the interior woodwork of houses it is a most permanent and beautiful white. The gloss, if objectionable, can be removed by rubbing with powdered pumice stone and crude oil with a piece of hair cloth.

No. 2,489.—**Silvering Glass** (J. W.).

Glass which is to be silvered must be perfectly clean. Just before applying the silvering liquid, it should be thoroughly scoured with alcohol and precipitated chalk and then cleansed with distilled water. The liquids required for silvering are best prepared, perhaps, after Dr. Kayser's directions (in *Zeitsch. f. angew. Chem.*, 1890, 541).

I. **Silver Solution.**—Dissolve 10 Gm. of crystallized nitrate of silver in 50 C.c. of distilled water, and gradually add a solution of ammonia (free from impurities) until the produced precipitate has been redissolved. Now add, under constant stirring and in drops, a solution of 1 part of nitrate of silver in 5 parts of water until a faint opalescence of silver oxide is produced. The liquid is made up with distilled water to 1 liter, and then allowed to stand until it has become perfectly clear, when the clear solution is poured off.

II. **Reducing Fluid.**—Dissolve 20 Gm. of Rochelle salt and 20 Gm. of rock candy in 200 C.c. of distilled water, add a solution of 4 Gm. of nitrate of silver in 20 C.c. of distilled water, shake well, heat to boiling, and keep it at a boil for half an hour. Then remove it from the fire and at once dilute it with cold water so as to make 1 liter. Shake well and filter.

When a surface is to be silvered, equal volumes of the two liquids are mixed, and the mixture immediately poured on. If the surface to be silvered is flat, suitable borders of wax or other materials must confine the fluid to the desired space. If the interior of glass vessels is to be silvered, enough liquid is poured in to fill the vessel up to the desired point.

The silvering is completed in fifteen to twenty minutes. Care must be taken to maintain a temperature between about 25° and 30° C. (77° to 86° F.). When the silvering is completed, the liquid is carefully poured off, and the surface washed with distilled water having the same temperature as the silvering liquid. Finally the surface may be coated with a thin shellac varnish.

No. 2,490.—**Assay of Opium** (U. S.).

We have given Dieterich's process, which our correspondent chiefly inquires about, on several occasions and in detail (see this journal, 1887, 143, etc.). In view of the frequent inquiries, however, which we receive regarding opium tests, we will briefly recapitulate it.

Carefully triturate 6 Gm. of powdered opium in a mortar with 6 Gm. of water, then add a little more water, and transfer the whole into a small tared flask, using enough water for rinsing the mortar, etc., to make the contents of the flask weigh exactly 54 Gm. Agitate the flask repeatedly during one hour, then filter through a folded filter of 10 Cm. diameter, and collect exactly 42 Gm. of the filtrate. To these add 2 C.c. of normal water of ammonia (17 Gm. NH₃ in 1 liter), mix well but without violent shaking (to avoid foaming), and immediately filter through a ready-prepared, dry, plaited filter of 10 Cm.

diameter (in this way most of the narcotine is removed, but there must be no delay in filtering). Of this second filtrate take 36 Gm., which correspond practically to 4 Gm. of opium. Dieterich assumes that opium contains 60 per cent of matters soluble in water; hence that on treating 6 Gm. of opium with 48 Gm. of water the resulting solution weighs 51.6 Gm., the balance of the opium (2.4 Gm.), consisting of insoluble matters, being held in suspension. The 42 Gm. of filtrate first obtained, therefore, correspond to 4.9 Gm. of opium. On adding 2 C.c. of ammonia solution, the total weight will be practically 44 Gm. of liquid. On filtering this, the 39 Gm. of second filtrate correspond, therefore, to 4.009 Gm. of opium, or, practically, to 4 Gm.

The 36 Gm. of the second filtrate are received in an accurately tared Erlenmeyer flask, and 10 Gm. of pure acetic ether are added, whereupon the contents of the flask are gently agitated by rotation, to prevent the formation of an emulsion. Next, 4 C.c. of normal ammonia are added, and the agitation (by rotation) continued until the liquid has become clear. Now cork the flask and set it aside. After 5, but not more than 6, hours, transfer the ethereal layer as completely as possible upon a smooth filter of 8 Cm. diameter, add 10 C.c. of fresh ether to the residuary liquid in the flask, rotate a few times, and transfer this also to the filter. When the ether has run off, pour the aqueous liquid upon the filter without taking any account of the little crystals adhering to the sides or bottom of the flask, and wash the flask and filter twice with 5 C.c. of water previously saturated with ether. Allow the flask and filter to drain well, dry both at 100° C., transfer the crystals adhering to the filter, by means of a camel's-hair brush, to the flask, and continue drying to a constant weight. According to a later publication of Dieterich, the morphine should be dried between 50° and 60° C., because it was found to lose more than 1 mol. of water when dried at 100° C. This is, however, denied by some experimenters.

Of course this process, like any other, does not extract all the morphine from opium. According to Dieterich's experiments, about $\frac{1}{2}$ to $\frac{3}{4}$ per cent of the morphine present remains in solution. In other words, each cubic centimeter of residual liquid still contains $\frac{1}{2}$ to $\frac{3}{4}$ Mgm. of morphine.

G. Loof subsequently published a method (in *Apotheker Zeitung*, 5, 271) which was devised with a view of shortening Dieterich's process. He gives the following directions (here briefly stated): Triturate 5 Gm. of opium with water, make up the total quantity to 78 Gm., shake frequently during two hours, and then filter off 60.8 Gm., corresponding to 4 Gm. of opium. Here again the 5 Gm. of opium are assumed to contain 2 Gm. of insoluble water. The other 3 Gm. dissolve in the 73 Gm. of water employed, thus making 76 Gm. of solution holding the insoluble matter in suspension. Therefore 4 Gm. of opium are equivalent to 60.8 Gm. of the solution. In the filtrate dissolve 0.2 Gm. of oxalic acid; after half an hour add 5.2 Gm. of the official solution of potassium carbonate (spec. grav. 1.332), agitate well by rotation (without shaking up and down), and at once transfer the liquid upon a ready-prepared, dry, plaited filter of 12 Cm. diameter. Care must be taken that everything is ready for the filtration, so that the required quantity of liquid passes through in about half a minute, during which time only narcotine, but no morphine, separates. Receive 16.5 Gm. of the filtrate in a tared Erlenmeyer flask of the capacity of 30 C.c. The 16.5 Gm. of filtrate correspond to 1 Gm. of opium. Add 5 Gm. of ether free from alcohol, close the flask with a carefully selected and well-fitting cork,

and shake briskly during ten minutes. Now dissipate the ether by means of a small rubber bellows, and, occasionally rotating the flask, transfer the separated morphine upon a small plain filter, wash it with water saturated with ether, dry at 45° to 50° C., and weigh. The result is stated to be just 1 per cent below that of Dieterich's method. Loof uses potassium carbonate as precipitant, because ammonia, if added in excess, dissolves morphine.

Recently Mr. J. B. Nagelvoort, of Detroit, has published his modification of Flückiger's process, which appears to yield very accurate results.

He prefers to apply the amount of ammonia necessary for precipitating the morphine—avoiding an excess as much as possible—to a dilute solution of the opium or morphine, rather than to first obtain a concentrated solution and to add ammonia in excess. His process is as follows, as applied to crude opium (*Amer. Journ. Pharm.*, August, 1890):

Dry 10 Gm. of crude opium, representing a true average sample of the lot to be assayed, in a porcelain capsule, at 100° C., for three hours, transfer to a dry mortar, and powder. Put the powder, without loss, into a filter of 2 inches diameter, pour slowly over the powder a mixture of 10 C.c. each of ether and chloroform, cover well, and, after the liquid has drained off, add 10 C.c. of chloroform. When this has drained off as far as possible, spread out the filter and dry its contents. Then carefully transfer the washed and dried opium to a vial of the capacity of about 120 C.c., add 100 C.c. of water, cork, and frequently shake the vial during two hours. Now filter off 50 C.c. into a small salt-mouth bottle, add a mixture of 10 C.c. of alcohol (94 per cent), 20 C.c. of stronger ether, and 1 C.c. of water of ammonia (10 per cent), and shake for six hours. [This is, practically, scarcely possible without a mechanical contrivance. Where this is available, it may well be used; otherwise a frequent shaking, for about ten minutes at a time, during six hours will have to do.—ED. AM. DRUGG.] Collect the morphine on a tared filter, wash with as little cold water as possible, or wash with a saturated aqueous solution of morphine, press the filter between blotting paper, afterwards dry it at 100° C. to a constant weight, and weigh it between watch glasses. The weight multiplied by 20 gives the percentage of pure morphine.

The author does not give any specific directions how the morphine suspended in the mixed liquids is to be collected upon the filter, or, rather, how the ethereal layer is to be separated. But he adds the following remarks which serve in place of directions: Squibb's manner of removing the ether from the morphine is an improvement on Flückiger's method. If this be done by filtering paper, care must be taken that fine crystals are not taken up by capillary attraction. Or, the ether may be diluted with fresh ether and removed with a pipette, which is more satisfactory than decanting the ethereal liquid from a salt-mouth bottle. This manipulation has the advantage of preventing the formation of a resinous layer of narcotine along the edge of the filter during the filtration.

Information Wanted.

The composition of the following is asked for by correspondents of this journal:

1. Hayden's Viburnum Compound.
2. Wyatt's Broncholine.
3. Smith Bros' Cough Drops.

BIBLIOGRAPHY.

ARZNEIBUCH FÜR DAS DEUTSCHE REICH. Dritte Ausgabe. (Pharmacopœia Germanica, editio III.). 8vo, Berlin, 1890.

The new German Pharmacopœia which has recently been published by the German Government, and which is ordered to go into effect on January 1st, 1891, marks a decided improvement over its predecessor. We were somewhat surprised at the time when we received news of the decision of the Bundesrath (of June 12th, 1890) to issue the work at once, since we had not long previously received information that there was some uncertainty regarding the early issue of the work. For some reason or other, extraordinary care seems to have been taken not to permit the text as finally adopted—and which was kept standing in type in the Government printing office—to reach the hands of any but the official members and a few specially favored individuals. We

surmise that the principal motive of this was the desire to prevent those who intended to write commentaries on the work—several of which latter had been announced to be in active preparation—from getting ahead of each other. However this may be, the work has been issued and the commentaries are already under way. One of these bears evidence that its principal portion (based upon a previous similar work) was practically completed before the Pharmacopœia appeared, and that only such changes were made in the manuscript as were rendered necessary by the differences between the old and the new text.

Among the new features adopted we find several which are based upon our own standards. One of these is the new class of fluid extracts and the general directions for preparing the same. Two general formulæ are given, one for fluid extracts prepared with menstrua containing glycerin, and another for those in which the menstruum contains no glycerin. The two formulæ are practically identical with those contained in our National

Formulary, and, indeed, we know of no better and conciser ones than these. Our method in prescribing the fineness of powders by indicating the size of mesh of the sieve has likewise been followed, though it was preferred in certain cases to give the exact lumen of the mesh in millimetres, rather than to state how many meshes there should be in a linear inch. In the case of cut drugs the size of mesh is given; in the case of powders the number of meshes in 1 Cm.

Among the general directions the following may be mentioned here: All qualitative tests shall be made, unless otherwise directed, in test tubes of about 20 Mm. (about $\frac{1}{2}$ inch) in diameter, and with 10 C.c. of the liquid to be tested. The centigrade thermometer is to be understood in all cases. When no special temperature is mentioned it is understood that it is 15° C. Volumetric solutions should be prepared and employed at 15° C. The reagents are to be employed in solution of the strength prescribed in the appendix, except when otherwise directed. The chemicals used for test-

ing or entering test solutions must conform in strength and purity to the official standards. If no special directions are given the substances are understood to be taken in a pure state. Maceration is to be conducted at 15° to 20° C., and digestion at 35° to 40° C., the mixture being in both cases repeatedly stirred or agitated.

The greatest innovation, and one which constitutes the greatest progress, in our judgment, is the abandonment of the Latin language in the text of the Pharmacopœia. Modern chemical processes are best expressed and understood in the language in which we daily read and speak of them. There will hereafter be no more chance of doubt regarding the exact modern equivalent of some Latin term expressing properties or facts which we have precise words for, but which require to be circumscribed in Latin. In the main body of the work the titles are given both in Latin and in German, and all synonyms are relegated to a table at the end.

Fluid extracts are to be prepared weight for weight. But the fluid extracts which are actually introduced are only four, viz., those of Condurango (a drug which we have, in this country, happily gotten rid of, having faithfully tried it for a number of years in cancer, without success, though we had the genuine "Mata-perro"), Frangula, Hydrastis, and Ergot. We have no doubt that a practical experience with this class of preparations will soon induce our German confrères to introduce other fluid extracts, such as those of gentian, ipecac, licorice, rhubarb, senega, etc., etc.

Of the articles heretofore official, 59 have been discarded. Among them are the following which are also official in our Pharmacopœia, and will probably remain so: Bisulphate of Quinine, Codeine, Extract of Cannabis Indica, Iodide of Mercury (green), Sulphate of Morphine (the hydrochloride is preferred in Germany), Benzoate of Sodium, and Iodide of Lead.

On the other hand, 60 new articles have been introduced. They are as follows (we use the official names): Acetanilidum, Acidum nitricum crudum, Acidum trichloraceticum, Adeps benzoatus, Æther bromatus, Agaricinum, Albumen Ovi siccum, Amylenum hydratum, Antipyrinum, Balsamum toluatanum, Capsulæ (general directions), Chininum tannicum, Chloralum formamidatum (= Chloralamide), Cocainum hydrochloricum, Codeinum phosphoricum, Cortex Quillajæ, Cuprum aluminatum, Electuaria (general directions), Emplastra (general directions), Emplastrum Cantharidum pro usu veterinario, Extracta fluida (general directions), Extractum Condurango fluidum, E. Frangulæ fluidum, E. Hydrastis fluidum, E. Secalis cornuti fluidum, Ferum citricum oxydatum, Granula (general directions), Gutta Percha, Homatropinum hydrobromicum, Hyoscinum hydrobromicum, Keratinum, Linimenta (general directions), Liquor Ferri albuminati, L. Ferri Iodati, Mentholum, Naphtalinum, Naphtolum, Natrium thiosulphuricum, Paraldehydum, Pastilli (general directions), Phenacetinum, Phytostigminum sulphuricum, Pilulæ (general directions), Resorcinum, Rhizoma Hydrastis, Rotulæ Sacchari, Salolum, Sebum salicylatum, Semen Arecæ, Semen Strophanthi, Species diureticæ, Styli caustici (general directions), Sulfonalum, Suppositoria (general directions), Tabulæ (general directions), Terpinum hydratum, Thallinum sulphuricum, Tinctura Strophanthi, Unguentum Acidi boric, Vinum Uduquantum.

Among these will be recognized certain substances which are partly

or wholly controlled by proprietary rights, and which, under present circumstances, are not likely to be made official in our own Pharmacopœia. Opinions differ with regard to the propriety of admitting or rejecting these substances. There is no doubt that most of them are recognized and prescribed by physicians throughout the world. It remains to be seen whether the armor of proprietorship cannot be stripped from at least some of them, so as to remove the only objection, in this country, to their official recognition.

The text of the Pharmacopœia—from which we shall give extracts as occasion may require—is followed by an appendix containing a list of reagents, tables of maximal doses, of poisons and of substances to be kept apart from others, a table of specific gravity of liquids between 12° and 25° C., a very full table of synonyms, and an index of the German titles.

The paper and press work are excellent, and the price, 2 marks, merely a nominal one, being only the actual cost of the work to the Government, which, of course, paid the expenses of the commission, and printed all circulars and preliminary documents required by the latter.

A SYNOPSIS OF MORBID RENAL SECRETION. Second Edition. Revised by ALBERT ABRAMS, M.D., Adjunct to the Chair of Clinical Medicine, and Demonstrator of Pathology, Cooper Medical College, San Francisco, etc. 1890. The Bancroft Company, 721 Market street. \$1.00.

THIS consists of a sheet of cardboard upon which are arranged in tabular form, and in readable type, the various pathological conditions and tests, therapeutic hints, etc., which relate to them. It is quite likely that the chart may be of use in the apparatus closet of a physician, or the clinical room of a hospital, where such labor-saving methods are often in demand.

ONTSMENTS AND OLEATES, Especially in Diseases of the Skin. By JOHN V. SHOEMAKER, A.M., M.D., Professor of Materia Medica, etc., and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia, etc. Second Edition. Revised and Enlarged. Philadelphia and London: F. A. Davis, 1890. Pp. 298, small 8vo.

THE first edition has been greatly augmented by much new material relating to oleates and detailed formulæ for the ointments official or in common use in this country, in Great Britain, Germany, France, Austria, Italy, Spain, Mexico, and Chili, so that it constitutes one of the most valuable works of reference on this particular topic of which we have any knowledge. The running commentary which accompanies the formulæ relates not only to their peculiarities as they concern the pharmacist, but also as their usefulness is of interest to the prescriber. Much care and labor have evidently been taken by the compiler and author, and the work cannot fail to be of service to all interested in this subject.

ESSENTIALS OF PRACTICE OF PHARMACY. Arranged in the form of Questions and Answers. Prepared especially for Pharmaceutical Students. By LUCIUS E. SAYRE, Ph.G., Professor of Pharmacy and Materia Medica of the School of Pharmacy of the University of Kansas. Philadelphia: W. B. Saunders, 913 Walnut Street. 1890. Pp. 179, small 8vo. Cloth, \$1.00.

No other description of this work is needed than its title page, the ability of Prof. Sayre to do it well being generally recognized.

PHYSICAL DIAGNOSIS AND PRACTICAL URINALYSIS. An Epitome of the Physical Signs of the Heart, Lung, Liver, Kidney, and Spleen, in Health and Disease. Edited by JOHN E. CLARK, M.D., Professor of General Chemistry and Physics in the Detroit College of Medicine. 41 illustrations, pp. 193, small 8vo. Muslin, \$1.00.

REPORT of the Microscopist for the Year 1889. Author's Edition. From the Annual Report of the Department of Agriculture for the Year 1889. Published by authority of the Secretary of Agriculture. Washington: 1890. Pp. 10, 8vo, with 8 chromo-lithographic plates.

THIS interesting report by Mr. Thomas Taylor relates to "Tea and its Adulterations," and "Olive Oil, Lard, and their Adulterants: Original Investigations relating to Color Reactions." It would be impossible to do justice to the text of his report without the beautiful illustrations which accompany and form a part of it.

INTERNATIONAL MEDICAL CONFERENCE.

a. Report and Recommendations concerning a Plan of Arbitration for the Settlement of Disputes between the American Republics. b. Report and Recommendations in Postal and Cable Communication with Central and South America. c. Report and Recommendations concerning Sanitary and Quarantine Regulations in Commerce with the American Republics. Washington: Government Printing Office, 1890.

RECIPROCITY TREATIES WITH LATIN AMERICA. Message of the President of the United States, and Letter of the Secretary of State, submitting the Recommendations of the International American Conference. Washington: Government Printing Office, 1890.

REPORT of the Twenty-ninth General Meeting of the Austrian Apothecaries' Association, held at Graz on the 25th, 26th, and 27th of August, 1890. By ANTON J. SICHA, Editor of the *Zeitschrift*, and Secretary to the Association, etc. Vienna: 1890. Published by the Association. Pp. 68, 8vo.

TWENTY-SIXTH ANNUAL REPORT of the Alumni Association, with the Exercises of the Sixty-ninth Commencement of the Philadelphia College of Pharmacy for the year 1889-90. Philadelphia: 1890. Pp. 228, 8vo.

THIRTIETH ANNOUNCEMENT of the Chicago College of Pharmacy, Winter Term, 1890-91, commencing October 6th, 1890.

PROSPECTUS of the St. Louis College of Pharmacy, Twenty-fifth Annual Session, from October, 1890, to March, 1891.

BOSTON UNIVERSITY SCHOOL OF MEDICINE [Homœopathic]. Eighteenth Annual Announcement and Catalogue, 1890-91.

GRASSES OF THE SOUTHWEST. Plates and Descriptions of the Desert Region of Western Texas, New Mexico, Arizona, and Southern California. Part I. By DR. GEO. VASEY, Botanist, Department of Agriculture. Issued Oct. 13th, 1890. Published by Authority of the Secretary of Agriculture. Washington: Government Printing Office, 1890. 50 plates with text, 8vo.

AN editorial note states that this bulletin constitutes half of the first of two volumes of a work entitled "Illustrations of North American Grasses." The study has been undertaken with a view to increasing the vegetation, especially the grasses and forage plants, upon the arid plains of the Southwest.

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LABORATORY APPARATUS.

THE accompanying cut illustrates the interior of a laboratory such as is recommended by certain leading firms in Europe.

The source of heat and power is derived from an upright tubular boiler, fed with water through a pump. Steam passes from it to the steam drying closet in the corner, to a steam evaporating kettle with movable evaporating pans; next to a distilling apparatus, and to a steam table for the preparation of infusions, decoctions, etc. On the other side is a steam kettle which can be tilted over when it is to be emptied. Next are placed several steam baths and a vacuum apparatus. Of course, the arrangement may be altered to suit circumstances. But the illustration will be of use to those who contemplate the fitting-up of a laboratory, by suggesting not only an economical utilization of space, but also an elegant and pleasing style of apparatus.

The steam kettle with mechanical contrivance for tilting is shown in a separate cut.

Both illustrations represent work executed by F. H. Meyer, of Hannover.

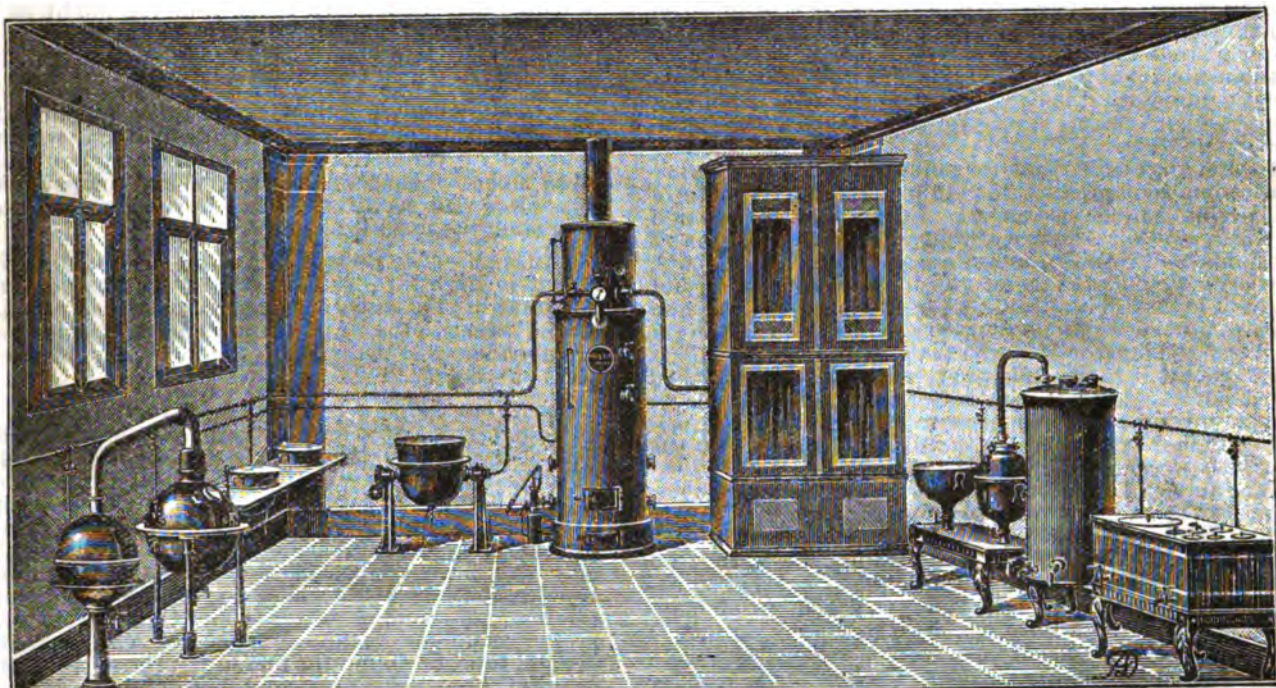
Medicated Waters.*

BY W. P. DE FOREST, OF BROOKLYN, N. Y.

IN accordance with the request of this society, I to-day present a report of a series of experiments on medicated waters, and also show samples of the same. Pressure of business prevented me from extending my investigations to the full line of waters used in dispensing or ordered by the Pharmacopœia, but enough has been done to show what the result would be with the ones omitted.

The subject of medicated waters has received considerable attention from pharmaceutical workers for many years past, and their criticisms induced the revisers of the Pharmacopœia, in 1880, to change the practice of more than half a century in the manufacture of these preparations. The new process has not met with the favor expected of it, for, as far as I can learn, but very few druggists prepare their waters according to the 1880 pharmacopœial method, while with some it has led to open opposition, being designated by them as the "cotton picking business."

As the time is at hand for another revision, it is well



Meyer's Apparatus for Pharmaceutical Laboratory.

Test Paper for Acids.

BY S. J. HINSDALE, FAYETTEVILLE, N. C.

CUT white filtering paper of neutral reaction in pieces of about 6 inches square, and impregnate them with tincture of curcuma (1 part curcuma, 7 parts alcohol, and 1 part water). Place the paper on threads to dry. When dry pass a sheet of it through a bath composed of 40 drops of Liquor potassæ and 100 C.c. water. Then immediately pass it through a bath of water (flat earthen dishes are convenient for the baths), and at once place it on a thread to dry. As soon as it is dry cut it in pieces and enclose them in tinfoil. The paper will not bear long exposure to light and air, but will keep well if enclosed in tinfoil.

It is much more sensitive than litmus paper, and will detect acid in a mixture of 1 part of hydrochloric acid in 150,000 parts of distilled water, and will detect carbonic acid in spring water. If the water be boiled to expel carbonic acid, and a yellow color is produced, some free acid (besides CO₂) is shown to be present.

The best way to use the paper is to touch it with a glass rod which has been wetted with the liquid to be tested.

The paper can be freshly prepared in fifteen or twenty minutes.

[Note by Ed. Am. Drugg.—The author has sent us a specimen of the paper. We have tried it, and find it to be all that is claimed for it.]



Meyer's Steam Kettle.

for us to examine the different processes, to see if a formula cannot be selected that will give, with but little trouble to the busy druggist, a strongly impregnated water suitable for medical purposes.

The process of distilling the drug with water is conceded by all to furnish the best product for flavor and fragrance, yet it will not be, as it never has been, accepted by the druggists of this country. The majority do not have the appliances for distillation, and they believe the gain is too small, for the importance of these waters is not great enough to compensate for the time required to prepare them in this manner. The compilers of the Pharmacopœia recognized this, and ever since 1830 have

discarded that process, and in its place, until 1880, authorized the rubbing of the volatile oil of the drug with carbonate of magnesium, so that it would be brought to a fine state of subdivision and thereby a larger portion taken up by the water. That this gave pretty general satisfaction is evidenced by the length of time it remained official; but the fact that a portion of the magnesia is dissolved by the water, and is liable to decompose the salts of any alkaloids that should happen to be prescribed with the water, made the Pharmacopœia committee ten years ago decide to change to cotton.

* Paper read before the Kings County Pharm. Society.

It is doubtful if the danger was great enough to warrant this, for certainly we have heard of no serious results in the many years that carbonate of magnesium was authorized. The change in the Pharmacopœia of 1880 was so radical, and the new process so unclear, that it is not wonderful the majority of druggists will not accept it. It is one among other things that have led some druggists to speak lightly of the 1880 Pharmacopœia and to avoid it. The old formula was easily and quickly executed; sometimes it could be done while the customer was waiting for the prescription. With the cotton process that would not be practicable.

Various substances have been proposed to take the place of carbonate of magnesium—viz., powdered glass, pumice, phosphate of calcium, talcum, etc.—but none have given as much satisfaction as carbonate of magnesium, except possibly talcum. Dr. Charles O. Curtman, of St. Louis, made a number of experiments, which he published in a paper read before the American Pharmaceutical Association in 1887. He found that talcum was unobjectionable and made a very strong water. It is questionable whether this substance is not as liable to the same objections as the carbonate of magnesium, for it is also slightly soluble in the water. Glycerin has been proposed, to be rubbed with the oil and the water added. This, as will be seen by referring to the samples, gives a fairly good result. As it possesses but little solvent power over the oil, its virtue consists simply in keeping the oil divided by its viscosity until after the water is added, for after that most of the oil can be seen floating on the top or lying at the bottom of the mixture.

Probably the best method, and the one that approaches the nearest to distillation without its trouble, is the use of boiling water to dissolve the oil; the latter is dropped on blotting or filter paper or paper pulp in a bottle, and hot water poured upon it—or it may be put into the hot water without the aid of paper—the mixture well agitated from time to time until it is cold, and then filtered. This is a very easy and cleanly process and furnishes a very satisfactory product.

To sum up, I think that for quickness of manufacture and strength of product the old process of carbonate of magnesium cannot be excelled. But for convenience and strength, and for absence of danger of decomposition of alkaloidal salts, the hot-water process should be adopted. Glycerin would rank next. As for distilling, I do not think it is at all practicable for retail pharmacists, and I am positive it would not be practised by them. It might be a good thing for the wholesale manufacturer; for if that process is made obligatory, and a penalty attached for departing from it, the majority of retail druggists would purchase their supplies rather than make them. For camphor water, either the old 1870 process or the new 1880 process will have to be chosen.

The samples I have here to show you are five of camphor water; camphor rubbed with glycerin, and water added; camphor dissolved in alcohol, and water added; camphor rubbed with water alone, one sample of the 1870 process and one of the 1880 process; five samples of cinnamon water in which glycerin, talcum, carbonate of magnesium, and hot water are used; three of spearmint, two of peppermint, and one of anise.

Notes on Some Commercial Drugs and Chemicals.*

Atropine Sulphate.—The new German Pharmacopœia now excludes the former commercial article, which used to be a mixture of hyoscyamine and atropine sulphate. Pure atropine sulphate is now demanded. The melting point of this is 115° C.

Carbolic Acid.—The new German Pharmacopœia permits to use, besides absolute phenol, also the crystallized acid melting at 40° C. The former Pharmacopœia allowed a faint reddish tint, but this is no longer permitted. The new requirement is that the acid should permanently remain colorless.

Cresalol (para)—that is, salicylate of para-cresol (para-cresol salicylic ether)—has been only occasionally demanded. It was recommended by Bouchardat as a remedy in summer diarrhœa and cholera morbus.

Ethyl Bromide.—The new German Pharmacopœia gives a method for preparing this substance. It is required to have the spec. grav. 1.445 to 1.450, that is, it is allowed to contain a small percentage of alcohol. The consumption of ethyl bromide has, however, considerably diminished. Moreover, several authorities advise against its use when prolonged narcosis is indicated. Some of the disagreeable after-results reported are "katzenjammer," fetid breath with a taint of garlic or phosphorus. Possibly these are due to contaminations.

A patent has been granted for the process of depriving ethyl bromide of alcohol by means of sulphuric acid, although protest has been raised against the award of this patent.

Glycerin.—Gehe & Co. report that the new test for the purity of glycerin required by the new Germ. Pharm.—addition of ammoniacal solution of silver nitrate, which

should not produce a yellow color within five minutes—is too rigorous, they having met only a single specimen which would stand this test.

Guajacol is not used in the same increased proportion as creasote.

Hypnal—produced by combining chloral with antipyrin, and recommended as a safe and efficient hypnotic—has been only in sporadic demand.

■ **Lanolin.**—The use of this ointment base is constantly extending. It is, so to say, indispensable when ointments containing substances like hydrogen peroxide, calcium bisulphite, and calcium chloride are to be prepared. Unna, for instance, uses the following combinations:

- | | |
|--|-----------------|
| I. Solution of Peroxide of Hydrogen..... | 20 to 40 parts. |
| Vaseline..... | 20 " |
| Lanolin | 10 " |
| II. Solution of Calcium Chloride (38½%)..... | 40 " |
| Simple Ointment..... | 20 " |
| Lanolin..... | 10 " |

The latter forms the basis of all chloride of calcium ointments, and may be modified at will by the addition of resorcin, oxide of zinc, sulphur, etc.

Lysol.—This new antiseptic, regarding the nature and preparation of which no definite information is available, appears to consist of saponified tarry oils. It is, therefore, similar to creolin and other similar compounds. It is said to be very effective, and to have an advantage over creolin in this, that it forms a clear solution in water.

Methylacetanilide.—Under this name the substance bearing the trade-marked name *exalgine* might be used and sold without hindrance everywhere. This we infer from Gehe & Co.'s remarks, as well as from private information.

Phenacetin.—New derivatives of this compound are reported to be methyl- and ethyl-phenacetin, which are obtained by the action of iodide of methyl or iodide of ethyl upon phenacetin-sodium. Both compounds are hypnotics and sedatives. They have, however, not appeared on the market as yet.

Platinum.—The price of this metal has rapidly tripled, and it is highly probable that it will rise very much higher still. The cause is partly a diminished production of the mines in the Ural, owing to drought, and partly a greatly increased demand of the metal for electro-technical purposes.

Quinidine Sulphate.—The use of this cinchona alkaloid, during recent years, has become so extensive in the United States that the demand could not be completely filled, and the price advanced to about three times its former figure. According to Gehe & Co., it is chiefly used (in the United States) as an ingredient of a proprietary medicine for malaria. Originally it was probably so used, as it was so much cheaper than quinine. Besides, it enabled the sellers to puff the remedy as containing "no quinine," against which there is considerable prejudice among certain uneducated classes. At the present time, no doubt, the manufacturers of this remedy would like to substitute the cheaper quinine.

Quinine Sulphate.—The new German Pharmacopœia has adopted the modified Kerner's test for determining the purity of this salt. The amount of water of ammonia allowed to be added so as to produce a clear solution is 4 C.c. This is equivalent to demanding an almost chemically pure salt, an absolutely pure one requiring 3.4 or 3.5 C.c. of ammonia. The new Germ. Pharm., therefore, at present requires a higher degree of purity than any other, which, of course, enhances the price considerably, but the required purity may be attained without great difficulty by the manufacturer. This pure form of sulphate of quinine, however, appears in form of heavier and denser crystals, which is a disadvantage to the quinine trade with countries where people are accustomed to buy the salt in the voluminous, light form at present in vogue.

Tannic Acid.—The official tests of the purity of this substance may be advantageously supplemented by observing the color of its 20-per-cent alcoholic solution. The color of this solution often reveals a dark color of the dry acid more readily than an inspection of the acid itself.

—•••—
Capsules for Treatment of Gonorrhœa.—Dr. J. W. White, of the University of Pennsylvania, recommends the following mixture, in capsules, for the treatment of acute urethritis. In about two-thirds of his cases the discharge ceased within a week. In the majority it was necessary also to use an injection, and for this he recommends 2 to 10 grains of sulpho-carbolate of zinc in 1 ounce of a 10-volume peroxide of hydrogen solution:

- | | |
|--------------------------|------------|
| Salol..... | 8½ grains. |
| Cleoresin of Cubebs..... | 5 " |
| Copaiba Balsam..... | 10 " |
| Pepsin..... | 1 " |

—Therap. Gaz.

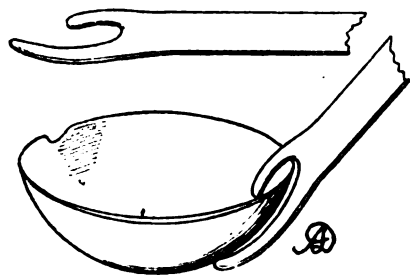
* From the September Report of Gehe & Co., of Dresden.

A HOLDER FOR EVAPORATING DISHES.

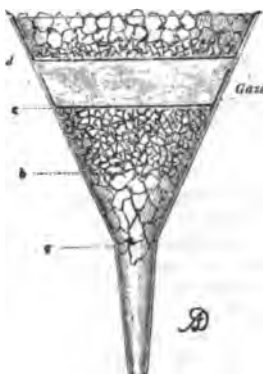
P. BOESSNECK has devised a holder for evaporating dishes. Its shape imitates that of an arm and hand, and may be made of some kind of hard wood [ash, for instance].—*Chem. Zeit.*, 14, 870.

FILTER FOR FRUIT JUICES AND SIMILAR LIQUIDS.

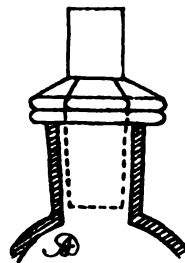
J. ROLFFS recommends, for filtering fruit juices or other liquids which require rapid filtration to prevent their spoiling, to employ a rather thick layer of filter-paper pulp between two pads of gauze. The accompanying cut illustrates the arrangement. A large funnel is filled about half-full with broken glass. Upon this is placed a layer of absorbent gauze, the edge of which extends some distance up along the walls of the funnel. Upon the gauze is then placed a rather thick layer of moist filter-paper pulp, on top of this another layer of gauze, and, to keep it in place, a lot of broken glass is put on top. Water is then passed through until the filtrate is perfectly clear. The filter is now ready, and will be found to work a long time without becoming clogged.—*Pharm. Zeit.*, No. 61.



Boessneck's Holder for Evaporating Dishes.



Rolffs' Filter for Fruit Juices, etc.



Swarts' Stopper for Reagent Bottles.

IMPROVED REAGENT BOTTLE STOPPERS.

IN order to prevent the annoying immobility of glass stoppers in reagent bottles containing caustic alkalis and certain other liquids apt to cement the stopper so that it cannot be removed, Th. Swarts recommends that the stoppers of reagent bottles be ground so that the conical part fitting into the neck does not fit tight, but that the shoulder of the stopper should be ground together with the neck of the bottle, so as to make a tight joint. Kaehler & Martini, of Berlin, have these bottles in stock.—*Chem. Zeit.*, 14, 836.

The Chemistry of Artificial Musk.

A PRODUCT obtained by the oxidation of oil of amber with nitric acid was at one time known by the name of artificial musk, since it possessed an odor somewhat resembling the latter. But it never had any commercial value. For a year or so past, however, another chemical substance, possessing a powerful musk-like odor, yet having a distinctive difference, has been produced under patents in two French factories. Albert Baur, who discovered it, recently gave some information regarding its constitution.

The starting point is isobutyl-toluol (CH_3). $\text{CH}.$ $\text{CH}.$ C_6H_5 . [This is obtained from rosin oil (the distillate obtained from rosin) by heating it with oil of vitriol to 100° C., which results in the production of several isomeric sulphonic acids. These are converted into lead salts, and the latter decomposed, in hot solution, by hydrochloric acid. The resulting product contains both the meta- and the para-compound. The former is in large excess and is the substance required. It is separated by fractional distillation.] The pure isobutyl-toluol, as used in this process, boils at 185°–187° C. (uncorrected). This is heated during twenty-four hours on a water bath with five times its weight of a mixture of fuming nitric and sulphuric acid. The result is a mixture of nitro-products, chiefly consisting of trinitro-isobutyl-toluol. By repeating the process the latter is obtained pure. It forms white needles, melting at 96°–97° C., insoluble in water, soluble in alcohol and ether. Even very dilute solutions of it have a very strong musk-like odor, though this is somewhat different from that of natural musk.

The new artificial musk is not poisonous. The homologues of isobutyl-toluol form similar derivatives likewise possessing a strong musk-like odor.—After *Compt. Rend.*, 111, 238,

Anemone Pulsatilla

Grows abundantly almost everywhere on the Continent, including those areas where the *Adonis vernalis* (see page 226) is found. Nature, in fact, has arranged the association and succession of the two plants very conveniently for the collector, since just as the time for taking *Adonis* is over, the best period for the collection of *Pulsatilla* begins. Perhaps few plants exhibit such marked variations in different districts as *Pulsatilla*, and if the systematic botanist ever makes a hobby of this species he might be able to establish to his own satisfaction at least a dozen distinct variations—if, indeed, he did not class them as distinct species.

The whole plant is cut down and used fresh as it is for making the homœopathic tincture.

The fresh juice is also expressed and used in the same department of medicine. *Pulsatilla* is sometimes in great demand, and in connection with this, as producing an effect upon the propagation of the whole species, we have to bear in mind that its use is of comparatively recent date, so that the methods of collection are not matters of transmission from generation to generation.

Collection is, as a rule, only undertaken by express order, and the crop is almost exclusively taken up by homœopaths and proprietors of patent medicines.—*Chem. and Drugg.*

Composition of Digitonin.

ACCORDING to Schmiedeberg, commercial *digitalin* contains in addition to digitoxin, its most important pharmacological constituent, three glucosides, namely, digitonin, digitalin, and digitaleïn, the first in greater amount, and when heated with dilute acid it yields a substance which reduces Fehling's solution, and also a crystalline compound insoluble in water, which he named digitogenin.

H. Kiliani has recently investigated this subject (*Berichte*, 23, 1555). He dissolved 1 part of commercial digitalin in 10 parts of water, added 1 part of concentrated hydrochloric acid (spec. grav. 1.19), and heated the mixture for six hours on the water bath. By this means a solution and a light-gray precipitate were obtained. The solution contained about equal quantities of two glucoses, which were identified, by means of the melting points of their ozones and their behavior when oxidized, as galactose and dextrose respectively. The precipitate of digitogenin was crystallized from alcohol, and found to be rather more than equal in amount to either of the two glucoses. It has the constitution ($\text{C}_27\text{H}_{44}\text{O}_{11}$), probably $\text{C}_{27}\text{H}_{44}\text{O}_{11}$. Digitonin has, therefore, very probably the composition $\text{C}_{27}\text{H}_{44}\text{O}_{11}$, and its hydrolysis is expressed by the equation:



This would require a ratio of 1.4 : 1 : 1 between the weights of digitogenin, galactose, and dextrose formed; that actually found is more nearly 1 : 1 : 1, but it must be remembered that at the moment of hydrolysis digitogenin is much more easily attacked than galactose and dextrose, and very readily yields resinous products. An analysis of the raw material agreed well with the formula $\text{C}_{27}\text{H}_{44}\text{O}_{11}$; not so, however, did Schmiedeberg's analysis.

Digitogenin.—The following details may be added to Schmiedeberg's data regarding this substance:

One part requires for solution 35 parts of boiling or 100 parts of cold 93-per-cent alcohol, and 20 parts of boiling or 30 parts of cold chloroform, and 30 parts of cold glacial acetic acid; it is insoluble in water and aqueous alkalis. It seems to form a compound containing chloroform of crystallization, which loses its chloroform only very slowly at 110°. With alcoholic potash it forms a crystalline potassium compound, strongly alkaline, and little soluble in alcohol.

It forms no stable compounds with barium hydroxide or phenylhydrazin, but is attacked by mineral acids and oxidizing agents.—After *J. Chem. Soc.*

Cements of Rubber and Gutta-Percha.

In making a cement, one should know pretty thoroughly, says the *Rubber World*, what is to be expected of it before they could advise upon it.

For instance, an ordinary rubber cement will hold on a host of different surfaces and with the best of success, except where there is continued dampness. For holding to damp walls, or surfaces where there is a constant presence of moisture, there is nothing equal to Jeffry's Marine Glue, the formula for which has been published and republished all over the world.

It consists of:

India Rubber.....	1 part.
Coal Tar.....	12 parts.
Asphaltum	2 "

The rubber, after having been massed, is dissolved in the coal tar, and the asphaltum is then added. This glue, as its name indicates, is oftentimes used for mending articles at sea, or patches, for instance, that are to be laid on surfaces that are to be under water, and it has been found to be a most excellent thing.

Of glass cements there are a great many, rubber, as a rule, being dissolved in some very volatile solvent, and some hard-drying gum is added. A gutta-percha cement for leather is obtained by mixing the following; it is used hot: Gutta-percha, 100 parts; black pitch or asphaltum, 100 parts; oil of turpentine, 15 parts. An elastic gutta-percha cement—especially useful for attaching the soles of boots and shoes, and which, on account of its great elasticity, it is not liable to break or crack when bent—is prepared as follows: By dissolving 10 parts of gutta-percha in 100 parts of benzin. The clear solution from this is then poured into another bottle containing 100 parts of linseed oil varnish, and well shaken together. To make it adhere tightly, the surface of the leather is slightly roughened.

Good rubber cement for sheet rubber, or for attaching rubber material of any description or shape to metal, may be made by softening and dissolving shellac in ten times its weight of water of ammonia. A transparent mass is thus obtained, which after keeping three or four weeks becomes liquid, and may be used without requiring heat. When applied, it will be found to soften the rubber, but when the ammonia is evaporated it forms a kind of hard coat, and causes it to become impervious to gases as well as liquids. Davy's universal cement is made by melting 4 parts of common pitch with 4 parts of gutta-percha in an iron vessel and mixing well. It must be kept fluid under water or in a dry hard state. A very adhesive cement, especially adapted for leather driving belts, is made by taking bisulphide of carbon 10 parts, oil of turpentine 1 part, and dissolving in this sufficient gutta-percha to form a paste.

The manner of using this cement is to remove any grease that may be present in the leather by placing on the leather a piece of rag and then rubbing it over with a hot iron. The rag thus absorbs the grease, and the two pieces are then roughened and the cement lightly spread on. The two pieces are then joined and subjected till dry to a slight pressure.

A solution of gutta-percha for shoemakers is made by taking pieces of waste gutta-percha, first prepared by soaking in boiling water till soft. It is then cut into small pieces and placed in a vessel and covered with coal-tar oil. It is then tightly corked to prevent evaporation and allowed to stand for twenty-four hours. It is then melted by standing in hot water till perfectly fluid, and well stirred. Before using it must be warmed, as before, by standing in hot water.

A cement for uniting india rubber is composed as follows: 100 parts of finely chopped rubber, 15 parts of resin, 10 parts of shellac; these are dissolved in bisulphide of carbon.

Another india-rubber cement is made of 15 grains of india rubber, 2 ounces of chloroform, 4 drachms of mastic; first mix the india rubber and chloroform together, and when dissolved the mastic is added in powder. It is then allowed to stand by for a week or two before using.

Cement for sticking on leather patches and for attaching rubber soles to boots and shoes is prepared from virgin or native india rubber by cutting it into small pieces or else shredding it up; a bottle is filled with this to about one-tenth of its capacity; benzin is then poured on till about three parts full, but be certain that the benzin is free from oil. It is then kept till thoroughly dissolved and of a thick consistence. If it turns out too thick or thin, suitable quantities must be added of either material to make as required. An elastic cement is made by mixing together and allowing to dissolve the following: Four ounces of bisulphide of carbon, 1 ounce of fine india rubber, 2 drachms of isinglass, $\frac{1}{4}$ ounce of gutta-percha. This cement is used for cementing leather and rubber, and when to be used the leather is roughened and a thin coat of the cement is applied. It is allowed to completely dry, then the two surfaces to be joined are warmed and then placed together and allowed to dry.

Cement used for repairing holes in rubber boots and shoes is made of the following solution: 1. Caoutchouc, 10 parts; chloroform, 280 parts. This is simply prepared

by allowing the caoutchouc to dissolve in the chloroform. 2. Caoutchouc, 10 parts; resin, 4 parts; gum turpentine, 40 parts. For this solution the caoutchouc is shaved into small pieces and melted up with the resin, the turpentine is then added, and all is then dissolved in the oil of turpentine.

The two solutions are then mixed together. To repair the shoe with this cement, first wash the hole over with it, then a piece of linen dipped in it is placed over it; as soon as the linen adheres to the sole the cement is then applied as thickly as required.

A New Monobromocamphor.

THE action of bromine on camphor may be said to be a commercial process for the production, for pharmaceutical purposes, of the ordinary monobromocamphor, or monobromated camphor. The yield of the latter is, in the first operation, a comparatively small one. There accompanies the crystalline bromocamphor a considerable quantity of an oil which, according to Swarts, is the hydrobromide of bromocamphor, $6C_{10}H_{16}BrO + HBr$. By distilling this oil the yield of bromocamphor is, as is known, materially increased. The existence of such a compound as that assumed by Swarts is, however, open to serious doubt. J. E. Marsh has recently investigated the action of bromine upon camphor (*Journ. Chem. Soc.*, 1890, 828), and has found that it results in the production of two isomeric monobromocamphors.

The ordinary monobromocamphor of the Pharmacopœia may be designated as the alpha variety. Its properties are sufficiently well known.

The new isomer, designated as iso- or beta-monobromocamphor, is best prepared by the action of bromine on camphor in presence of alcohol, the diluent alcohol which was also employed by Swarts appearing to facilitate the subsequent separation of the two isomers. This separation is in any case a difficult one, and Mr. Marsh is unable to say that he separated the bodies absolutely. Still there can be no doubt about the general results.

The beta-isomer is extremely soluble in alcohol, and is separated from the ordinary variety by fractional crystallization from alcohol. It is further separated from unaltered camphor by distillation *in vacuo*. On solidifying, after being thus distilled, it forms an almost transparent mass, easily breaking up into a soft, granular powder, very different in appearance from the hard crystals of the ordinary modification. It melts at about 61° C. It is very soluble in alcohol, chloroform, carbon bisulphide, petroleum ether, and glacial acetic acid. It rotates the plane of polarized light to the right, but less so than the ordinary variety.

Detection of Biliary Matter in Urine.

ACCORDING to Dr. Adolf Jolles, of Vienna, who has made a comparative study of the various bile reactions so far proposed, the most reliable tests are those proposed by Rosenbach and by Huppert.

Rosenbach's test is as follows: A piece of filtering paper is wetted with the filtered urine, and a drop of nitric acid then applied to it. Colored rings will form about the drop of acid (*Centralbl. f. med. Wissensch.* [1876], 14, 5).

Huppert's test: Precipitate the urine with milk of lime. Exhaust the precipitate with alcohol containing sulphuric acid, and apply heat. A green color is developed (*Archiv f. Heilkunde* [1867], 8, 351, 476).

Dr. Jolles has found that both tests are capable of improvement. In the case of Rosenbach's he recommends the following modification: Filter a large quantity of the urine to be tested through pure, white filtering paper, then apply to the inside of the filter a drop of concentrated nitric acid containing some nitrous acid, and pass the funnel containing the filter three or four times, and slowly, over a Bunsen burner. After a few minutes observe the rings which will have formed around the drop. If they are colored green, bile pigments are present. The application of a gentle heat reveals even traces of these pigments. The bright-green ring shows the presence of biliverdin.

The reliability of Huppert's test depends mainly upon the strength of the milk of lime. As the author of the test failed to specify it, Dr. Jolles made experiments, and found that the most suitable strength was about 1 per cent—that is, a milk of lime containing about 10 Gm. of lime in the liter. The test is best executed as follows:

About 8 to 10 C.c. of the urine are mixed with an equal volume of the milk of lime, the mixture is shaken, and the precipitate separated by filtration. The precipitate is then transferred, by means of alcohol and diluted hydrochloric acid, into a beaker, the whole filtered again, and the filtrate raised to boiling. If biliary pigments are present, the liquid assumes a color varying between green and blue; if none are present, it remains colorless.—After *Zeitsch. f. anal. Chem.*, 1890, 402.

Borate of Zinc.—Borate of zinc, $Zn(BO_2)_2$, has recently been introduced as an efficient remedy in certain skin diseases, such as eczema. It is reported to act much better than the oxide, or even the benzoate or carbolate of zinc.

APPARATUS FOR THE AUTOMATIC FILLING OF FILTERS.

THE accompanying cut (Fig. 1) illustrates the method recommended by T. Guenther for keeping filters or funnels automatically filled, either in simple filtration or in washing precipitates.

When filtration is to be started, the rubber tube *d* is compressed with one hand and the rubber bulb *B* pressed with the other until the liquid rises through the tube *a* and flows into the filter. The tube *d* is now released and pressure on *B* removed. The apparatus then continues to work automatically until all the liquid in the flask *A*, down to the end of the tube *a*, has passed over. It will be noticed that the wide glass tube dipping into the filter serves as the air valve. When the liquid in the filter has sunk below the orifice of the tube a new supply of liquid passes over.—*Chem. Zeit.*, 14, 666.

A SIMILAR construction is employed in the apparatus devised by O. Kleinstueck (Figs. 2 and 3). In this a rather wide glass tube is introduced into the reservoir containing the liquid to be filtered. The glass tube may rest on the bottom or may be held by the stopper, but it must, at its upper part, be in communication with the air enclosed in the reservoir. Through the stopper and wide tube passes another, narrow glass tube, the end of which is cut off obliquely. The tube delivering the liquid into the funnel is bent at a right angle, and the vertical portion is of such a length that its orifice is about half an inch below the level of the outlet of the inner tube in the reservoir. Whenever the level of liquid in the funnel sinks to a level corresponding to the outlet of



Fig. 1.

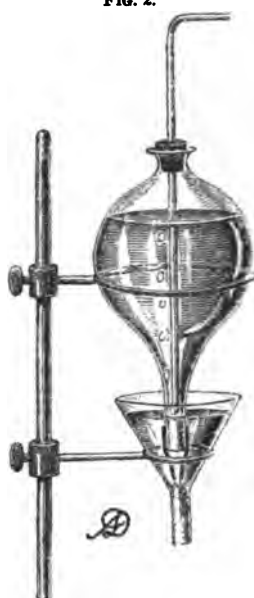


Fig. 2.

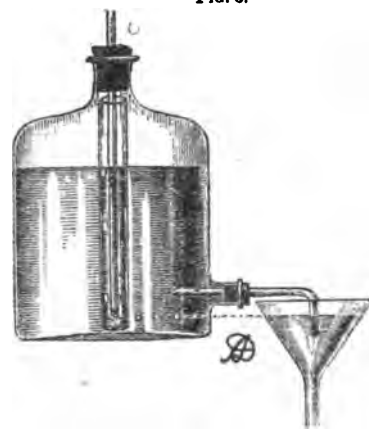


Fig. 3.

Apparatus for Automatically Filling Filters.

the inner tube (see the dotted line), air will pass into the reservoir through the inner tube, but it will be compelled to pass upward inside of the larger tube, whereby all disturbance or agitation of the main bulk of the liquid is avoided, which is sometimes of importance, particularly when it is not desired to disturb a precipitate. The flow of liquid stops as soon as the level of liquid in the funnel has risen again above the dotted line.

When it is desired to filter the liquid down to the last drop, it is best to use a large globe funnel as reservoir and to adjust this directly over the funnel.—*Chem. Zeit.*, 14, 666.

Assay of Belladonna and Belladonna Plasters.

At the recent meeting of the Amer. Pharm. Association held at Old Point Comfort, Va., Mr. Seward W. Williams read a paper on "Belladonna Plasters," in the course of which he gives an account of the generally accepted methods of assay of belladonna plasters, and submits a modified process devised by himself. It should be stated here that belladonna is no longer the only source of hyoscyamine or atropine, but that the root of *Scopolia Carniolica*, which is abundantly accessible in the market, affords the same alkaloids, hyoscyamine being held to be the alkaloid originally present in the root, which is, however, liable to be changed to atropine in the course of extraction. Regarding the assay of belladonna plasters the author says:

Methods for the valuation of belladonna plasters may be based upon the following facts:

The mass generally consists of extract, rubber, resins, etc. The active principle is alkaloid, which, when free, is soluble in chloroform, alcohol, ether, and benzol, and insoluble in water; when combined with an acid as a salt, it is soluble in water and alcohol, but insoluble in chloroform. Mayer's reagent—a solution of potassium mercuric iodide—combines in practically definite proportion with the alkaloid of belladonna. It is prepared by dissolving 13.546 Gm. of mercuric chloride in a solution of 49.8 Gm. of potassium iodide in about 800 C.c. of distilled water, and diluting to exactly 1,000 C.c. Repeated titrations of solutions of Merck's pure atropine, from 1 to 300 to 1 to 400 dilution, showed that 1 C.c. will precipitate 0.012 Gm. and nearly the same quantity

of hyoscyamine (0.0117). Dr. E. R. Squibb places the limit of the mydriatic power of belladonna alkaloid at 1 drop of a dilution of 1 to about 91,000 for sulphate, equivalent to about 1 to 106,000 for free alkaloid. Vitali's qualitative reaction is obtained by adding to alkaloidal residue upon evaporation a few drops of fuming nitric acid, heating on steam bath to dryness, and adding, when cool, a drop or two of an alcoholic solution of potassium hydrate—violet coloration.

Process 1.—Accurately weigh one or two plasters, cut in strips, remove mass from cloth with as little warm chloroform as will answer, transfer chloroform mixture to a globe separatory funnel, turn upon the cloth an equal volume of 24-per-cent sulphuric acid, transfer to separator, shake carefully with chloroform mixture, and allow liquids to separate several times. The chloroform mechanically carries the alkaloid, presumably as a salt, from the cloth to the separator, where the acid water on agitation takes it into solution. The chloroform mixture is run off and the water filtered into another separator. The chloroform is returned to separator and extracted with small portions of acid water until a little gives no reaction for alkaloid. The cloth is dried and weighed. The filtered acid water solution is washed with chloroform. It is then made alkaline with ammonia, and extracted with chloroform by careful agitation until a portion fails to give reaction for alkaloid when evaporated, dissolved in acid water, and tested with Mayer's reagent.

The chloroform extract, washed by agitation with distilled water, is drawn off and distilled or evaporated. The alkaloidal residue may be dissolved in about 350 times its weight of acidulated water and titrated direct with Mayer's solution; or it may

be purified by softening with a drop or two of chloroform, taking up with warm, stronger ether and filtering into tared beaker, when it may be evaporated and dried to constant weight.

This residue may be dissolved in just 300 times its weight of 24-per-cent sulphuric acid, one-half titrated with Mayer's reagent, a little of the remainder best made alkaline with ammonia and extracted with chloroform, evaporated for Vitali's test, and 1 C.c. diluted to 350 C.c. for physiological test. By this method, a plaster standardized to one-half per cent alkaloid, assayed 0.495 per cent by direct titration; another plaster, 0.52 per cent by weight of impure alkaloid, which in dilution of 1 to 109,500 (1 C.c. 1 to 300 solution to 365 C.c.) caused dilatation of the pupil within 45 minutes in three persons, a drop having been introduced into the eye of each.

The process would be theoretically more perfect if, in the first step, after removing the mass with chloroform, the mixture were introduced into the separator after the cloth had been washed with chloroform alkaline with ammonia, and the washing liquid shaken with the acid water, the cloth not being treated with water.

The one difficulty with this process is the formation of emulsions by shaking, which seriously embarrasses the operation. These emulsions may be evaporated and residue taken up with alkaline chloroform.

The process in its essential features accords with directions given by Dr. A. B. Prescott in his work on "Organic Analysis." There the first chloroform is made alkaline with ammonia, and absolute alcohol used to purify the final residue.

Process 2.—The writer has found it possible to avoid trouble with emulsions by the following method: Remove mass from cloth with chloroform alkaline with ammonia, and precipitate rubber with alcohol (94 per cent); drain off the liquid, soften the mass with a little chloroform and again precipitate with alcohol, and repeat operation if necessary to prevent occlusion of alkaloid by the rubber in precipitation. Unite the liquid extracts and evaporate on a little acid-washed sand not quite to dryness. Extract sand by rubbing up with 24-per-cent sulphuric acid until a check test shows the sand to retain no alkaloid. Sand is used to prevent occlusion by resinous matter. The acid-water extract is filtered

and washed with chloroform. It is then rendered alkaline with ammonia, extracted with chloroform, and further treated as in first process. In an assay by this process the alkaloidal residue purified with ether was, by calculation, 0.53 per cent. The alkaloid, though failing to fully titrate up to this weight with Mayer's reagent, showed a marked mydriatic effect in dilution of 1 to 108,000, one drop dilating the pupil in 40 minutes in one case and one hour in another. In experiments made with a view to abbreviating the process in point of time, Mr. C. E. Parker found that after precipitating the rubber with alcohol from the alkaline chloroform extract, the chloroform largely thrown out by direct addition of distilled water retained most of the alkaloid, and that by shaking the mixture with alkaline chloroform the alkaloid could be completely extracted, despite the carrying of some chloroform into the water by the alcohol.

The writer finds this abbreviation of the process a very practical improvement.

Process 3.—Take two plasters, accurately weigh and digest in 100 C.c. warm chloroform alkaline with ammonia. Drain the mixture from cloth, precipitate rubber with 50 C.c. of alcohol (94 per cent), and drain off liquid into a separatory funnel, shake with 150 C.c. of distilled water, and draw off chloroform into another separator. Treat the cloth with 50 C.c. alkaline chloroform, washing off the remaining mass, and with this mixture soften residual mass of rubber and gummy matter. Precipitate rubber again with 25 C.c. of alcohol. Shake liquid with the water mixture in first separator and draw off chloroform into the second. Repeat softening and precipitation of mass, if necessary, with 25 C.c. chloroform and 12 C.c. alcohol, and pass liquid through first separator as before; further extract liquid in first separator with alkaline chloroform, if necessary, and draw off into second. The chloroform in second separator is then extracted with acid water, and that, washed with chloroform and afterward made alkaline, is extracted with chloroform and proceeded with as in other processes. In an assay by this process an attempt was made to purify the residue by softening with chloroform, taking up with warm benzol, extracting with acid water, making alkaline, extracting with chloroform, and evaporating the chloroform, after washing with distilled water, in a tared beaker. Dried to constant weight the alkaloid weighed 0.1105 Gm. and calculated 0.478 per cent, showing a loss by purification. This residue was dissolved in 33.15 C.c. of 24-per-cent sulphuric acid. An exact cubic centimeter of this 1 to 300 solution was diluted to 435 C.c. with distilled water and well shaken. This dilution of 1 to 130,500 was tried upon the eyes of eight persons, one drop being used in each case. A dilatation was noted in each individual within 50 minutes. Scrupulous care was taken to avoid any contact with apparatus not perfectly clean. The remarkable activity in some cases indicated that the limit of dilution had not been reached. Dragen-dorff's limit, it may be noted, is 1 to 130,000 for atropine. This alkaloid was from *Belladonna Scopolia*, and would appear physiologically rather more active than that from *Atropa Belladonna*, if there be any difference. This process by direct titration with Mayer's solution gave practically 0.50 per cent alkaloid with plasters of same strength.

In the writer's experience volumetric work with Mayer's solution, when conducted under the same conditions used in establishing the factor from pure alkaloid, gives results which compare most favorably with gravimetric work in point of accuracy, and much more than favorably in the matter of time.

In working with Mayer's reagent shake the solution violently, after each addition of solution, in flask provided with tight rubber stopper. Toward the end of the process the solution will generally clear, so filtration is unnecessary.

In gravimetric work the perfect purification of the alkaloid without loss is a difficult matter.

In calculating results of volumetric work the number of cubic centimeters of Mayer's reagent $\times 0.012 \times 100 \div (\text{weight of plaster} - \text{weight of cloth})$ gives percentage of alkaloid in mass. In gravimetric work the weight of alkaloid $\times 100 \div \text{net weight of mass}$ gives percentage.

Absolute accuracy is not claimed for these processes, but they are capable of showing the strength within about one-fiftieth per cent alkaloid. Standardization within this narrow limit surely merits the name, in view of no pharmacopoeial standard other than that of a widely varying root.

The writer is indebted to Charles E. Parker, Ph.C., for valuable assistance in the work involved by this paper.

Koch is now a "bigger" man than old Bismarck.

Poisoning by Bromethyl.—Three cases of poisoning by bromethyl have lately taken place in Berlin, and Dr. Mittenzweigs, in the *Journal for Medical Officers*, warns people against the employment of this narcotic in dentistry, where it has been much used, as well as in small surgical operations, until proper experiments have been made. In the cases of poisoning above alluded to, the doses had not been more than about 20 Gm.

Adonis Vernalis.

THIS plant grows in some parts of Europe only in a limited number of places, and may be regarded as somewhat rare; its shining golden flowers, half hidden in the finely divided pinnate leaves, resembling a little bouquet artistically surrounded by delicate ferns. The *Adonis vernalis* is one of the prettiest of flowers. It blossoms in the earliest spring, when only the *Anemone sylvestris* throws up here and there its delicate white corolla, vying in grace and beauty with its more resplendent golden-hued relative.

Where the *Adonis vernalis* is found it will generally be met with in quantity, though not distributed over a very wide area. At one time such spots were the haunt of the botanist only, being remote from the public roadways, in quiet nooks unknown to the ordinary forest wanderer.

This all changed, however, when it was announced that the little ranunculaceous plant, connected by legend with a heart affection of another and less dangerous kind, possessed virtues that would render it valuable in the treatment of cardiac diseases.

The collection of the plant is simple enough. It takes place just when the flowering is over and the fruit is partially developed. It is then about one foot high, and is cut off close to the ground or uprooted. The drug is thus obtained at the period of highest physiological activity.—*Chem. and Drugg.*

Ether-Drinking in Ireland.

RECENT inquiries, says the *Telegraph*, show that in certain parts of Ulster methylated ether is still largely used in substitution for whiskey. The practice is believed to have originated during the phenomenally successful teetotal movement inaugurated in the first quarter of the present century by Father Mathew. Persons who had taken the pledge of total abstinence from whiskey discovered that without violating their consciences they could, by the use of ether, still indulge in the habit of intoxication. The secret gradually leaked out, the mischievous custom rapidly spread, and it has now, in particular districts, become confirmed. A medical correspondent affirms that the spirit referred to is very largely used in South Derry, particularly in the localities of Draperstown, Tobermore, and Maghera. "It is brought hither," he writes, "in large Winchester quarts, and is sold by grocers, etc., principally to women, who retail it through the country. It is called into requisition frequently at balls, lodge meetings, etc., when the public houses are closed or the drink runs short. The intoxicating effects come on speedily, and pass away with equal rapidity, so that one can get drunk and sober several times in the course of an afternoon and evening. This is one of its charms, another being its cheapness. I have heard of cases of over-doses of it, and I find that when taken along with, or shortly after, whiskey, the consumer becomes very outrageous—far worse than when whiskey alone is used. It is very hard to get any definite information as to the quantity brought to the locality, but it is very considerable. The atmosphere of Maghera, Draperstown, etc., on a fair day is polluted with the smell of it, so that you can scarcely escape it anywhere. About 2 drachms is the usual draught, but those who are accustomed to it can readily swallow an ounce at a time. It is the methylated ether that is invariably used."

These statements are fully borne out by inquiries in the Draperstown and Bellaghy districts. Another correspondent observes that "the ether is still largely used. I saw 100 gallons at one time in the stores of one dealer some twelve months before he died. I have seen gastritis of a subacute kind produced by its use. Last January a man on his way home died from the effects of it, and some time since several deaths from the direct effects of ether-drinking were recorded—some of them from spasm of the glottis."

In a further communication it is stated:

"In a district of South Derry included by a line drawn from Ballyronan through the villages of Castledawson, Knockloughrin, Gulladuff, and Claudy to Portglenone, and bounded on the other side by Lough Neagh, Lough Beg, and the Bann, ether-drinking is prevalent to some extent. It is not used, however, at all so extensively as in the districts having as their centre Maghera and Draperstown. It is sold in the village of Bellaghy by grocers. The draught—viz., the amount taken at one time—is 2 drachms usually, but much more can be taken as a draught by an experienced hand. I am informed that the singular thing about the ether intoxication is the rapidity with which it comes and passes off. A man may, in fact, be drunk all night, and yet have lucid intervals. A young boy of 14 once assured me that he could easily take a noggin, viz., 5 ounces, during a night; but then he belonged to a family all celebrated for their convivial powers. I have often noticed on Cookstown market days the odor of ether, and I have no doubt it is largely sold in that part of County Tyrone. Methylated ether is only 1s. 2d. per pound, while pure ether is 5s. 4d. per pound, wholesale price. It is the former, I believe, which is consumed."—*Br. and Col. Drugg.*

Toxic Effects of Exalgine.

MR. EDMUND E. DYER reports in the *British Medical Journal* (August 30th, page 506) a case in which the administration of exalgine for the relief of muscular rheumatism was followed by symptoms resembling those due to carbolic acid poisoning. The exalgine was ordered in a mixture with tincture of orange and water, in 2½-grain doses three times a day, the quantity being therefore somewhat larger than that given by Prof. Fraser, of Edinburgh, but less than that given by Drs. Bardet and Dujardin-Beaumetz.

Six doses in all were taken. The symptoms were: Sleep broken by starts and waking at short intervals; pain in the small of the back; urine olive-green, scanty, of high specific gravity, with large deposits of urates, but free from phosphates, albumin, or blood; temperature, 98°; pulse, 102, full and strong; thirst and hot and dry skin. The renal trouble disappeared upon stopping the exalgine and giving a diuretic and diaphoretic, and the cerebral symptoms passed off.—*Chem. and Drugg.*

The Toxic Principle of Insect Powder.

THE active principle of *Pyrethrum* flowers is, according to Schlagdenhauffen and Reeb, an acid (pyrethrotoxic acid) soluble in alcohol, amyl alcohol, ether, and chloroform, which may be isolated by means of ether, after having been converted into an alkaline salt and decomposed by tartaric acid in aqueous solution.

When pyrethrotoxic acid was hypodermically injected into animals, it was observed that the poison produced its effects in two distinct stages. In the first there was an excitement more or less pronounced, proportional to the quantity administered; in the second there was a complete prostration, accompanied always by paralysis of the lower extremities, which might disappear after a time, or be the precursor of a fatal issue, the respiration and circulation being affected only in the latter case.

Saponated Glycerin as an Ointment Base.

SOME time ago Dr. Von Hebra introduced a new basis for skin ointments under the name of "Glycerinum Saponatum," about which he spoke very highly. Recently he has given full particulars regarding the glycerin in the *Zeitsch. f. Therapie*. It is made from coconut oil or tallow soap which has been dried at from 80° to 100° C.; this is then powdered and dissolved in glycerin by the heat of a water bath, and filtered while hot.

The product on cooling is a yellowish, more or less elastic mass, which softens at the heat of the body. Obviously, it dissolves in water, and that is one property which makes it especially useful in the preparation of ointments.

Two strengths of the glycerin are used, one containing 8 per cent and the other 20 per cent of soap. The former is used for insoluble substances, such as oxide of zinc.

An ointment containing 5 per cent of the substance is very good for tender skin, and is simply rubbed on. It is specially serviceable as an application for chapped hands. For eczema an ointment composed of glycerin 78 parts, zinc oxide 20 parts, and starch 2 parts, is employed. Other preparations made with the softer glycerin are: (a) Sulphur, 10 per cent; (b) sulphur 20 per cent, and zinc oxide 10 per cent; (c) iodoform, 5 per cent; (d) chrysarobin, 10 per cent; (e) hydroxylamine hydrochloride, 1 per cent; (f) ichthyol, 5 per cent. With the harder Glycerinum saponatum the following preparations are made, viz.: (g) salicylic acid, 5 per cent; (h) salicylic acid and resorcin, 5 per cent each; (i) salicylic acid and creosote, 5 per cent each; and (j) salicylic acid 3 per cent, Pix liquida 10 per cent. It will be observed that for insoluble bodies the glycerin containing 8 per cent of soap is used.—*After Chem. and Drugg.*

The Cultivation of Castor Oil in Senegal.

THE *Moniteur Officiel du Commerce* publishes a report which the French Colonial Office has received from M. Carstaing on the subject of the cultivation of the castor-oil plant in Senegal.

In June, 1888, M. Carstaing drew the attention of the governor of the French colony of Senegal to the advantages which would accrue from the cultivation of the indigenous castor-oil plant, particularly the species which spontaneously decorticates itself in the sun, and which M. Carstaing had discovered. The government agreed to undertake experiments in this direction, and at the end of June, 1888, 10,000 seeds were sown in a plantation at Sor, near Saint-Louis, and 6,500 were distributed to private persons to experiment upon at the public cost.

The extreme dryness of the climate had prevented the success of several other attempts of a like kind, such as those with earth nuts, millet, and beans. It was, fortunately, found that the castor-oil plant was able to resist this obstacle, and in its first season the plantation at Sor produced 300 kilos of good seeds. In May, 1889, other plantations of castor oil were founded at Dakar-Bango, Louga, Kelle, and Thiès. By the close of December, 1889, the govern-

ment was able to announce that these new areas of cultivation had proved twice as successful as any one had dared to hope. The plants had in six months grown, at Thiès and elsewhere, to a height of from 3 to 4 meters, with a rich crop.

During the rainy season of the present year a great number of applications have been made by planters in various parts of Senegal for seed of the best quality, and fresh plantations have been opened, with 1889 seed, in Rufisque, Gorée, and other places. It has been so clearly shown that the soil and climate of Senegal are favorable to the growth of the castor-oil plant that preparations are being now made for a very wide cultivation of it throughout the colony in February, March, and April of next year. The principal difficulty in the way of this new industrial enterprise is the resistance of the natives, who cannot be persuaded that earth nuts and castor oil can be simultaneously grown in the same piece of ground. This is quite a mistake, however; by planting the castor-oil plants of the first year sufficiently sparsely, success is certain.

The principal trading houses of Bordeaux and Marseilles have promised to support the colony of Senegal in the cultivation of castor oil by offering a market for the product. They consider that the new industry will prove a source of immense wealth to the colony, the present prices being highly remunerative. The accident that the crops of earth nuts have lately been a failure makes the administration of Senegal only the more anxious to secure this new and valuable product. Offers have already reached Saint-Louis from two American houses, and it is believed that the colony will have no difficulty in selling all that it produces.

The numerous uses to which castor oil is now put are very encouraging to the cultivation of the plant. It can be utilized, besides in its medicinal capacity, in dyeing, soap making, greasing machinery, lighting, printing, the manufacture of Dutch cheese, exported butter, for cement in Java, and for food in China; the Chinese boil castor oil with alum and sugar to remove the bitter taste.—*Br. and Col. Drugg.*

An Organic Volatile Nickel Compound.

L. MOND and C. LANGER have found (*Chem. Trade Journ.*, 1890, 412) that nickel enters into a compound with carbon monoxide, having the composition $\text{Ni}(\text{CO})_4$. It was obtained by passing a mixture of gases (generator gases) containing CO over metallic nickel and cobalt, the authors intending to have the CO arrested by the metals and decomposed. Instead of this, a volatile compound containing nickel passed over, while the cobalt was found not to enter into combination with CO.

The new compound, $\text{Ni}(\text{CO})_4$, is a colorless liquid, volatile at the ordinary temperature, boiling at 43° C. (109.4° F.), and having the specific gravity 1.3185 at 15° C. It is soluble in alcohol, benzol, and chloroform. If the vapor is heated to 60° C. (140° F.), it explodes.

No practical use has as yet been made of this compound. But it is to be expected that it can be utilized, chiefly for technical purposes.

Oils of Mint and Origanum in Turkey.

In a recent number of the *Revue Medico-Pharmaceutique*, Mr. O. Boulonthian gives some interesting particulars of the essential oils of mint and origanum in Anatolia, in Asia Minor. Every one who has lived in Constantinople knows the yaghdjis, itinerant street venders of small bottles of essential oils of origanum, anise, mint, cassia, cloves, sandal-wood, and of a number of quack remedies for rheumatism, hæmorrhoid balsam, and so forth, which they carry on a tin tray. These yaghdjis all hail from the vilayet of Koniah, where the distillation of mint and origanum has been carried on for ages in the same old-fashioned way. The oils are distilled over an open fire, and the still used is exactly the same model as that employed in remote Turkish villages for the preparation of brandy. The villagers cut the plants and put them up in faggots or bundles, which they throw into the container and boil with water. The essential oil carried away by the vapor is collected by means of a feather.

The plant from which the mint oil is distilled in this district is the *Mentha rotundifolia*. It is exceedingly aromatic and rich in essential oil. The latter, when pure, is of a greenish color and has a slight odor of camphor.

It is always slightly cloudy, and possesses a faint by-flavor, owing to the rough manner in which the distillation is carried out. Of the two oils about 600 or 700 oke (an oke equals about 2½ pounds) are distilled every year—so the yaghdjis aver. The oils are very rarely had in a pure state, but it is thought that if the cultivation were carried on with modern stills and in a more business-like way, the oil of mint might have a good commercial future. At present a large quantity is exported from Constantinople to Egypt, but the bulk of it is retailed in the manner described, by the yaghdjis, who carry it all through European Turkey and Asia Minor.—*Chem. and Drugg.*

A Source of Error in Sulphuric Acid Estimation.

PROF. E. VON MEYER points out that sulphur is liable to be introduced even into plain water which is being evaporated over a gas flame in a porcelain capsule, the sulphur being recognized by a distinct reaction of sulphuric acid. The accession of sulphur from a gas flame to the contents of crucibles in which fusions are conducted has long been known, and is guarded against by every skilled analyst; but that sulphuric acid can be produced in a simple liquid like water during the process of evaporation is new. One of Prof. Meyer's assistants evaporated 2 liters of pure water, in a porcelain capsule standing upon a *high* water bath over a gas flame, to 60 C.c., which required six hours. The water was then found to yield 0.0426 Gm. of barium sulphate, corresponding to 0.00731 Gm. of SO₂ per liter.

Another assistant evaporated 1 liter of water in a platinum capsule over a small Bunsen flame, the quantity of water in the capsule being maintained at between 40 and 50 C.c. During twelve hours there were produced 0.0106 Gm. of SO₂.—*Journ. prakt. Chem.*, 1890, 270.

Chloroform Water as a Preservative.

JOS. F. BURNETT says:

For the keeping of various chemicals in solution, so as to be convenient in rapid dispensing, nothing that I have tried is so effective and at the same time so free from objection. It is, of course, not needed for the solutions of inorganic substances, such as potassium bicarbonate, magnesium sulphate, potassium bromide, etc., which are kept in most dispensing establishments. The advantage is evident in the case of solutions of organic chemicals, which are prone to decompose, ferment, etc., through the presence of fungoid organisms. The following is a list of these, which I keep regularly made, in each instance solution being effected by dissolving the substances in B. P. chloroform water, and adjusting to strength by a final addition of more chloroform water:

Citric Acid.....	1 in 2
Potassium Acetate.....	1 in 2
Potassium Citrate.....	1 in 2
Ferri et Am. Cit.....	1 in 2
Sod. Salicylat.....	1 in 2
Am. Chloridi.....	1 in 4
Am. Bromid.....	1 in 4
Quinine Sulphate*	1 in 10

Never in any of the above do I find any trace of fungoid growth, even though occasionally I have had a solution by me, in the varying temperature of summer and winter, for months. In speaking of solutions I will refer to two mixtures which are of equal convenience, viz., powdered rhubarb and aromatic powder of chalk, both of which I keep ready rubbed down with chloroform water (1 in 8), so that the time and trouble required in dispensing these in mixtures may not have to be expended a dozen times an hour. Mucilage of acacia made with aq. chlor. keeps indefinitely. Hitherto there can be no drawback to the use of chloroform water as a preservative, for the addition of 1 or 2 drachms, or even an ounce or two, to a mixture, cannot have any injurious effect on the patient. All the medical men for whom I dispense are aware of my practice, and none of them have any objection whatever.

The second class of substances I preserve with chloroform is infusions, either B. P. strength or concentrated 1 to 3. Those with which I have experience are quassia, both single and concentrated; gentian (strength as B. P., but without orange and lemon), single and concentrated; senega, single and concentrated; cascarrilla, single and concentrated; and calumba, buchu, and orange in the concentrated strength only. I find the preservative action of chloroform is perfect in all these when concentrated, the chloroform being added to the strained infusion in the proportion of 1 drachm (fluid) to each 40 fluidounces, and dissolved by agitation. The aroma of these preparations when diluted is much more like the fresh infusion than any concentrated 1 to 7 preparations of wholesale house manufacture I have used, and in no case does the chloroform cause any deposit—an advantage over alcohol when the infusion contains mucilaginous matter. Some practitioners object to the use of concentrated infusions preserved with alcohol on this very account. With the infusions made single strength (i.e., B. P.), chloroform in a less proportion than a half drachm to 40 ounces will not keep them at all, except in the case, perhaps, of cascarrilla, and if they are required to be kept more than a week they require rather more than that, unless alcohol be added as well. For instance, half an ounce of chloroform (dissolved by agitation) will not keep 2 gallons inf. seneg. good for seven days, but the same quantity with 2 ounces tr. seneg. will keep the same infusion a fortnight at least. From these experiences I infer that when chloroform is employed as a preservative the liquid must be nearly saturated with it, otherwise it will not preserve it for any great length of time. In the case of single strength infusions this is a disadvantage, as it will be seen at once that a dose of 1 or 2 ounces (if saturated with CHCl₃) contains from 2 to 5 minims of chloroform, which, of course, is in-

admissible, as it becomes a medicinal if not an injurious dose.

In some instances (I have not tried it in all) the chloroform may remain undissolved at the bottom of the bottle, when it exerts its preservative influence (as, e.g., in the case of solutions of pot. cit. and pot. acet.), but care must be taken not to pour it out when the bottom of the bottle is reached or neared.

MR. HAROLD WYATT, JR., a hospital dispenser, says:

Among the solutions in which chloroform water was used were those of quinine and of morphine; they remained quite clear and free from fungoid growth for a length of time equal to that during which 25 per cent of proof spirit would have kept them good. A mixture of ergot and strychnine used in the hospital kept very badly in the concentrated form, becoming fetid and covered with mould in four days; when made with chloroform water no change whatever occurred. Alkaloidal salts had also been very well kept in chloroform water, such as strychnine, morphine, cocaine, with no single failure. When 1 part of chloroform water was added to 6 of fruit juices the aroma was rather improved. In this way he kept raspberry, lemon, and blackberry. In allusion to the use of glycerin as an alternative to chloroform water, as recommended in the "Year Book" for 1888, the author said he had kept essence of rennet clear and free from the slightest unpleasant odor for a long time. Lastly, chloroform has proved an efficient and unexceptionable preservative in a preparation of opium used as an external application in which spirit was not desired.

A Note on Eucalyptus Oil.

THE following is contributed by Mr. P. W. Squire to the *Chemist and Druggist*:

Having lately had occasion to examine a number of samples of Eucalyptus oil, ordered and invoiced as Amygdalina, and the variations being more marked than in probably any other essential oil used in pharmacy, the results seem to be of sufficient interest to be placed on record.

The tests applied were: (1) specific gravity; (2) rotation as shown by a Zeiss polarimeter; (3) "phellandren" test, the presence of which is understood to distinguish the *Amygdalina* oil from that obtained from *E. globulus*.

[*Phellandren* Test: Dissolve a few cubic centimeters of the oil in twice its volume of glacial acetic acid, and add a saturated solution of sodium nitrite. The oil separates, generally assuming a green color, and in the case of an *Amygdalina* oil quickly sets to a semi-solid mass of phellandren nitrite, which afterwards becomes brown. The *Globulus* oil shows no solidification, and the green color is more permanent.]

	Sp. Gr.	Rotation.	"Phellandren."
A.....	0.912	+ 12°	None.
B.....	0.909	+ 12°	"
C.....	0.874	— 38°	Strong reaction.
D.....	0.889	— 24°	" "
E.....	0.897	— 30°	" "
F.....	0.893	— 8°	" "
G.....	0.817	— 120°	Very strong reaction.
H.....	0.874	— 111°	" "
I.....	0.909	— 5°	None.

Subjoined are also the figures for some oils invoiced as *Globulus*:

	Sp. Gr.	Rotation.	"Phellandren."
Californian....	0.909	+ 17	None.
Schimmel.....	0.915	+ 7	"
Merck.....	0.904	+ 11	"
Gehe.....	0.921	+ 4	"

The following general inferences may be drawn:

A and B are obviously *Globulus* and show that two of the largest London wholesale houses [and this seems to be the case also with some wholesale houses in this country.—ED. AM. DRUGG.] ignorantly or intentionally, are supplying this for *Amygdalina*.

C, D, E, and F are normal *Amygdalina* oils.

G and H are a variety of *Amygdalina* oil of which we have as yet seen no description. It is characterized by an abnormally high rotation, so high that the Zeiss instrument was incapable of measuring the angle till the oil was diluted with absolute alcohol. The phellandren reaction was also very strongly marked. One of the oils (G) was very dark yellow, and the other (H) quite colorless, but their other characters are so much alike that it is probable H is G redistilled.

I is an oil intermediate between the *Amygdalina* and *Globulus*, and is probably distilled from mixed leaves. It was obtained directly from the firm who were the first to point out the radical differences between the two varieties.

* By aid of q. s. H₂SO₄ dil.

Detection of Lead in Water.

HARVEY points out that even slight traces of lead may readily be detected in water by the chromate test.

To about 1½ liters (3 pints) of water about 2 grains of pure, crystallized chromate of potassium (*not* bichromate) are added, solution promoted by agitation, and the solution set alongside another glass containing the same water without addition. The water should not be acid, nor should it have been concentrated. The chromate must be added in crystals, not in powder. Water containing as little as ½ grain of lead in the gallon becomes turbid in about fifteen minutes. After twelve hours the precipitate has become completely deposited, so that the liquid may be poured off.

No other metal likely to occur in water yields a similar reaction. For practical purposes the above test is amply sufficient. One-fifteenth of a grain of lead in 1 gallon of water corresponds to 1 part of lead in 3,500,000 parts.—After *The Analyst*, 1890, 68.

The Cultivation of Opium in Mexico.

THE question of the desirability of cultivating the poppy in Mexico is being agitated. It is believed that a quality equal to the best produced in the various sections of Asia, where it is grown with most success, could be obtained. Sinaloa and Sonora are never troubled by the frosts which blight the crops of the plant in Persia and Western Asia. Further, the rich alluvial soils in the valleys of the Sonora, Oposura, Yaqui, Mayo, Rio Fuerte, and Rio de Culiacan will, without any question, result in opium of the finest kind being produced, such as never could be attained in the low damp soils of Bengal and Southern China.

The argument that cultivation of the poppy will bring along with it the curse of opium smoking has been satisfactorily met by the fact that the vice is almost altogether unknown in Bengal, Asia Minor, and Persia, where opium has been largely produced. Even suppose such were not the case, modern science cannot do without the drugs that come from the poppy. The improper use of a thing cannot, or at least ought not to, be the excuse of an embargo being placed upon its existence, when it can be shown the blessings that arise from it are so potent and numerous that it would be a crime to forbid its proper use. Medical practice shows laudanum and the other forms known to the Pharmacopœia to be imperative necessities. No squeamish arguments ought, therefore, to be allowed to maintain when the absence of opium from the physician's cabinet would be equivalent to the actual murder of a patient under many conditions that arise in the experiences of the disciples of Galen.

Great Britain now has a monopoly of the drug. She would no longer have it if Mexico, by the aid of American capital, were to enter into competition with her. Statistics show that the Indian government made a clear profit on the exportation of opium to the amount of about \$46,000,000 in 1872, almost the same sum that it realized in 1885. In order to hold on to this monopoly in India, where the government does not absolutely control, it puts on a duty of \$400 to \$450 a case, equal to about four Mexican dollars a pound. Mexico could almost at once obtain the entire Chinese trade and drive this British governmental trust out of the market. China alone cannot grow sufficient opium for her own use. Now she has to depend on England, and frequently for an inferior quality of the drug at the high prices charged for the best. As already stated, neither China nor Bengal approaches Mexico in the matter of desirable conditions for the production of opium.

The cultivation of the poppy is one of the simplest imaginable. In Mexico, even the very slight precautions deemed necessary to bring it to a condition suitable for the production of the inferior grades of opium of China and India need not be troubled about. Climate and soil combined would attend to that. The Indians of Mexico, including children, could be very quickly shown the simple methods of opium making. As soon as the poppy is ready, after some four months' growth, all that is wanted is to carefully make an incision with a knife into the fruit transversely from the top down. This is generally done in the afternoon, and the following morning the capsule will be covered with the juice of the plant. This is scraped off with a knife on to a poppy leaf, into which sufficient is gathered to make a small cake or ball. It is then wrapped up in a few leaves and left to dry. The same plant can be visited several times as its head ripens. The opium when dried up, and each pellet usually weighs between 1 and 2 pounds, is ready for sale.

In the matter of quality Mexico can have but one rival, and that is Egypt; but as that country only cultivates 4,500 hectares as against 2,250,000 in the Benares district of India alone, it would be hardly worth considering. If Mexico, as seems highly likely, at once enters into the production of opium, she would wonderfully increase her export trade and force English competition to the wall.

The *Mexican Financial Review*, which is greatly interested in the exploitation of the matter, says: "The In-

dian government pays the producer \$250 per case of opium, which sells for \$700 to the Chinese merchants. This sum of \$250 suffices to pay the cost of production and the profits of the grower. These figures may fairly be accepted as representing the probable return for a case of opium produced in Mexico; for, although labor is a trifle dearer here than in India, the soil would be virgin as far as the poppy is concerned, and would yield a richer harvest. The net profit on such a business to be divided between the Mexican producer and the Mexican government would thus be the difference between \$250 and \$700 per case, at which last it could be sold in China."—*Export and Finance*.

Note on the Comparative Medicinal Values of the Official Buchus.

MR. C. J. S. THOMPSON had his attention directed by a medical friend to the fact that the infusion of buchu leaves when prepared from the serratifolia variety differed slightly in color and taste from that made with either of the other official species. The medical gentleman also noted that in the case of a patient who had been in the habit of taking an infusion in which the crenulata or betulina varieties had been used, on an infusion prepared from the serratifolia leaves being substituted, the difference in the medicinal action was very marked. The characteristic features of the three official species of buchu leaves are well known. According to several investigations the therapeutic properties of the leaves are due to the presence of a volatile oil, having a peppermint-like odor, and of a bitter resin. The oil, which deviates the ray of polarized light considerably to the left, on exposure to cold furnishes Barosma camphor, forming needle-shaped crystals, having almost the exact odor of peppermint. On submitting the several varieties of buchu leaves to microscopical examination, it was noticed that the circular cells containing the oil on the under part of the leaf were closer together and much larger in the crenulata and betulina than in those of the serratifolia, the oil glands of the latter being both smaller and fewer in number. Assuming the therapeutic activity mainly to depend on the quantity of the volatile oil and resinous matter the leaves contain, a number of samples from each of the official sources were procured, with the object of estimating the average proportion of these principles present in each variety.

Several samples of the leaves of Barosma betulina having been treated with ether were found to yield on an average 4.25 per cent of resinous matter, of a dark, olive-green color, aromatic but bitter to the taste, and having the characteristic odor of buchu. It was found to be but slightly soluble in hot water, more so in alcohol, and easily soluble in chloroform. The same samples on distillation yielded on an average 1.45 per cent of volatile oil, which developed after a time the strong peppermint-like odor. From samples of the Barosma crenulata, submitted to similar treatment, an average of 3.75 per cent of resinous matter of same color and taste was obtained, and 1.6 per cent of the volatile oil. The samples of serratifolia, treated in like manner, gave an average of 3.45 per cent of resin, but of a bluish-green color and slightly different taste to the others. Barely 1 per cent of volatile oil was obtained.

On incineration the leaves of the betulina gave an average of 4.5 per cent of ash, those of the crenulata 4.6 per cent, and the serratifolia yielded 5.3 per cent. It has been suggested that the medicinal action in some instances is greatly assisted by the presence of the mucilage which buchu leaves contain in a considerable quantity, and that probably acts by allaying the irritation of the mucous membrane and assisting the volatile oil in chronic inflammation and other diseases of the genito-urinary organs. This suggestion would seem to be borne out by the fact that the fresh infusion of the leaves is preferred, and regarded as more effective than the tincture in the treatment of such cases. The leaves of the serratifolia species contain less mucilage than either of the other varieties.

The result of this somewhat rough investigation would seem to indicate that the leaves of Barosma serratifolia are probably inferior as regards their medicinal value to those of the Barosma crenulata or the betulina, and pharmacists would do well to employ the latter varieties only in making the official preparations.—*Br. and Col. Drugg.*

Effect of Temperature on Nessler's Test.—A. Hazen and H. W. Clark (*Amer. Chem. Journ.*, 12, 425) find that the low results obtained by them and by Smart were due, not to imperfect condensation of the ammonia, but to the low temperature of the distillates, which had been condensed in a block-tin condenser. It is found that the color produced in the Nessler test varies with the temperature, and is deeper according as the solution is warmer; it is thus necessary to bring the distillate and the standard ammonia solution to the same temperature before comparing the tints which they give with the Nessler solution.

The Quantitative Determination of Arsenic by Marsh's Apparatus.

DR. ED. POLENSKE some time ago showed that it was possible to make a quantitative determination of arsenic by means of Marsh's method; but, according to him, a very large amount of zinc and a very long time are required to complete the reaction. B. Kühn and O. Saeger have taken up the same subject, and have found that, by suitably altering the conditions, a much larger quantity of arsenic may be isolated and determined in a comparatively short time.

It has heretofore been generally held that arseniuretted hydrogen does not react with potassa. The authors, however, found that it does. Hence no wash bottle containing solution of potassa must be interposed in the current of the gas.

In order to obtain exact results, the directions below given must be scrupulously followed.

The apparatus required is an Erlenmeyer flask of the capacity of about 400 C.c., into which 150 Gm. of arsenic-free zinc, in granules, are introduced. The flask is closed with a doubly perforated rubber stopper, carrying a funnel tube, 50 Cm. long, reaching to the bottom of the flask, and also a gas delivery tube connected with a 50-C.c. wash bottle containing solution of acetate of lead, for the purpose of arresting any hydrosulphuric acid which may be generated. The wash bottle is connected with a large and several small drying tubes containing at least 100 Gm. of fused chloride of calcium. The last of these drying tubes is connected with a piece of so-called combustion tubing about 165 Cm. long. This long tube rests in a combustion furnace of 80 Cm. in length and having 24 burners, in such a manner that it projects about 25 Cm. over the furnace on the side of the chloride of calcium tubes, and about 60 Cm. on the other side. Its inner diameter should be 10 to 12 Mm. The portions projecting beyond the furnace are drawn out so as to be only of 5 Mm. calibre. The furthest end of this tube is connected with a flask containing solution of nitrate of silver.

Over the funnel tube passing through the stopper of the Erlenmeyer flask are arranged two burettes, one of which is filled with pure diluted sulphuric acid (1 volume of acid of spec. grav. 1.840, and 3 volumes of water). The other burette contains the arsenical liquid, which should not contain more, or correspond to more, than 0.110 Gm. of arsenious acid in 25 C.c.

After the apparatus has been put together and tested as to tightness, the generation of hydrogen gas is started by allowing about 30 C.c. of the diluted sulphuric acid to flow into the flask. When all air has been expelled, all the burners of the furnace are lit and the combustion tubing heated as far as it lies in the furnace. If after half an hour no sign of an arsenical mirror is visible in the contracted portion of the tube at the further end of the furnace, the materials and apparatus may be regarded as being uncontaminated with arsenic.

Three more separate burners are now placed under the projecting end (60 Cm.) of the combustion tube, at intervals of 15 Cm., so as to render the tubing red hot—care being taken to support it properly—and then the arsenical liquid is allowed to pass into the flask in drops, not more rapidly than 0.5 C.c. per minute, particular care being taken that the current of hydrogen gas remains active and regular. The proper rate is such that the bubbles of gas passing through the lead solution can just be counted. This is best attained by allowing the sulphuric acid to pass into the flask at the rate of about 0.75 C.c. per minute.

After a few minutes, an arsenical mirror will make its appearance in the contracted part of the tube beyond the furnace. Frequently there will also be a mirror formed beyond the first and second separate burners, but none will be formed beyond the third if the process is conducted as above directed. Nor will there be any change produced in the silver solution. Should there be the least sign of a metallic mirror beyond the third burner, the current of gas must be moderated, or the whole experiment repeated.

It should take one hour to pass the 25 C.c. of arsenical liquid into the apparatus. The heat and current of gas, however, are continued for two hours longer, and the passing current of gas is occasionally tested for arsenic by applying a burner to the contracted part of the tube before it enters the furnace. If an arsenical mirror forms here, it is simply driven forward by applying heat. If none forms, the arsenic is all volatilized.

When this is the case the apparatus is allowed to cool, with the current of gas still passing. Next a current of pure hydrogen is passed through the tube in the opposite direction, and all the minor arsenical mirrors driven forward so as to join the main one, which has acquired a black color, of a metallic lustre. The portion of the tube containing the mirror is then cut out, dried, and weighed. After dissolving off the mirror with strong nitric acid, the empty tube is washed, dried, and weighed again. The difference is the quantity of metallic arsenic found.

If it is desired to preserve the mirror, it is best done in the following manner: Introduce the narrow tube containing the mirror into a larger one drawn out to a point. Apply heat gradually near the open end, and the mirror

will eventually be driven by the flame into the point of the larger tube. The small tube can then be removed empty and weighed.

The analytical data accompanying the original are very satisfactory.—After *Berichte*.

A New Method of Testing Honey.

DR. OSCAR HAENLE has communicated a new method for ascertaining the purity of honey.

It is only about five years back that every expert would have condemned as adulterated any honey which was found to turn the ray of polarized light to the right instead of to the left.

About that time Dr. Haenle succeeded in finding, while travelling, some natural (wild) honey which polarized to the right. This was subsequently ascertained to be due to the fact that the bees fed upon coniferous products, while those feeding upon flowers produced dextrogyre honey. While the polariscope had, before this discovery, been generally used as a certain criterion to distinguish between genuine and adulterated honey, this instrument could no longer be employed for the purpose without some restriction. The author has now ascertained that if the honey be dialyzed before the polarization test is applied, the result is a certain indication of the character of the honey.

Honey consists of grape sugar and fruit sugar. The crystallizable part of honey is the grape sugar, while the other constitutes the uncrystallizable part. [Fruit sugar, or levulose, is also crystallizable, but with some difficulty.—ED. AM. DRUGG.]

From the author's account of experiments we select the following, which show how the method is applied and how the results are interpreted. [It remains to be seen, however, whether the finally remaining feeble polarization to the right is a constant and invariable property of a honey adulterated with glucose, or whether protracted dialysis could not extract the glucose entirely.—ED. AM. DRUGG.]

I. EXPERIMENTS WITH HONEY COLLECTED FROM FLOWERS.

1. A pure Alsatian honey was dissolved in twice its weight of water. The solution polarized 28° to the left (-28°). It was then subjected to dialysis during sixteen hours, after which the residue remaining in the dialyzer was optically inactive (0°).

[The author does not describe the form of dialyzer he used. We shall have occasion to try the method, and shall use a dialyzer made of artificial parchment, of considerable width, so that only a shallow column of liquid shall be dialyzed at a time.—ED. AM. DRUGG.]

2. Thirty Gm. of a pure honey were dissolved in 150 Gm. of water, the solution decolorized and then dialyzed. After eighteen hours the residue was inactive.

3. Fifty Gm. of a similar honey were dissolved in 250 Gm. of water. The solution polarized at -11° . After sixteen hours' dialysis the residue was optically inactive. On further evaporating the latter and again dialyzing, its inactivity remained unaltered.

II. EXPERIMENTS WITH GLUCOSE SYRUP.

4. A 10-per-cent solution of glucose syrup which polarized 100° to the right ($+100^\circ$) was decolorized and then dialyzed. After sixteen hours it still polarized $+5^\circ$. The residue was then concentrated, and in proportion as this progressed so rose the angle of polarization.

III. EXPERIMENTS WITH HONEY PURPOSELY ADULTERATED.

5. Forty Gm. of a pure honey, polarizing in a 1 in 2 solution at -35° , were mixed with 10 Gm. of glucose syrup. A 10-per-cent solution of the mixture was subjected to dialysis, and the residue was found to remain dextrogyre at $+4^\circ$.

6. Thirty Gm. of a pure honey were mixed with 20 Gm. of glucose syrup, dissolved in 250 parts of water, and the solution decolorized by charcoal. It polarized at 65° . After twenty-four hours' dialysis the residue retained a permanent polarization of $+14^\circ$. After concentrating this residue to half its weight its polarizing angle had increased to $+60^\circ$.

7. Fifty Gm. of a pure honey were dissolved in 250 Gm. of water. The solution polarized at $+95^\circ$. It was then dialyzed, and the liquid on the dialyzer examined in intervals of two hours. The following is the rate at which polarization decreased until it remained constant:

After 2 hours.....	$+45^\circ$.
" 4 "	$+33^\circ$.
" 6 "	$+18^\circ$.
" 8 "	$+15^\circ$.
" 9 "	$+12^\circ$.
" 10 "	$+11^\circ$.
" 11 "	$+10^\circ$.
" 12 "	$+10^\circ$.

Further dialyzation did not change the angle ($+10^\circ$).

General Conclusions.—Any honey which, after having been dialyzed, does not turn the ray of polarized light to the right, is free from glucose. Any honey which, after dialysis, retains a permanent dextrogyre polarization, contains glucose.—After *Pharm. Zeit.*, 1890, 441.

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EDITORIAL.

NOTHING in the way of medical discovery during this century has equalled in importance the announcement made by Prof. Robert Koch, of Berlin, in the *Deutsche Medicinische Wochenschrift* of November 14th, of a cure for tuberculosis; and were it not that the probability and scientific accuracy of its author are too well established to admit of doubt, much that is claimed for this new remedy would be incredible. Like most discoveries of great importance, the narrative is so simple and direct as to win our unqualified admiration.

A despatch from Berlin of November 20th says:—"The 'Frank Courier' states that the lymph used by Professor Koch for the cure of tuberculosis is prepared in an incubating stove within a space that is hermetically sealed and sterilized, and thereby rendered free from fungus. The interior of the air-tight space is divided by an unglazed porcelain diaphragm into an upper and lower section. In the upper section is placed a salted meat broth in a gelatinous state, containing colonies of the tubercle germ. This mass gradually liquefies, and the gelatin liquid drops slowly through the porcelain plate into the lower section. The liquid then contains all the secretory products, but is free from all living or dead germs or reproductive spores, and is the lymph as used."

In other words, the lymph is an organic fluid containing the ptomaines developed by the growth of the tubercle bacillus in the meat broth.

Professor Koch says:—"This remedy is a brownish, transparent liquid, which does not require special care to prevent decomposition. For use this fluid must be more or less diluted, and the dilutions are liable to undergo decomposition if prepared with distilled water. As bacterial growths soon develop in them they become turbid, and are then unfit for use. To prevent this, the diluted liquid must be sterilized by heat and preserved under a cotton-woolstopper, or, more conveniently, prepared with a one-half per cent solution of phenol. It would seem, however, that the effect is weakened both by frequent heating and by mixture with phenol solution, and I have therefore always made use of a freshly prepared solution. Introduced into the stomach the remedy has no effect. In order to obtain a reliable effect it must be injected subcutaneously.

"When injected under the skin of a healthy human being, 0.01 C.c. produces hardly any or no reaction. The same is true with regard to those who suffer from other diseases than tuberculosis. When, however, the subject of the experiment suffers from tuberculosis, the injection of 0.01 C.c. causes severe general and local

reaction. The general reaction consists in an attack of fever, which usually begins with rigors and raises the temperature above 39°, often up to 40°, and even 41° C. This is accompanied by pains in the limbs, coughing, great fatigue, and often sickness and vomiting. In several cases a slight icteroid discoloration was observed, and occasionally an eruption like measles on the chest and neck. The attack usually begins four to five hours after the injection, and lasts from twelve to fifteen hours. Occasionally it begins later and then runs its course with less intensity."

Passing over the description of the local effects of the remedy, it is to be remarked that its usefulness in determining the existence of tubercle in suspected cases is perhaps of quite as much importance as its curative properties, since it is curative only during the first stage of the disease and before the tubercular deposits have become dead matter.

Already hundreds of physicians and thousands of invalids have gone to Berlin, and the effect of this sudden influx of infected persons must become a subject which greatly concerns the residents in the hotels and boarding houses of that city, and must lead to some expedition in disseminating, through reliable channels, the knowledge requisite for the production and use of the remedy.

Looking at the question from a purely business point of view, there is little immediate advantage to accrue to pharmacists. The production of the ptomaine-bearing lymph is likely to remain, for some time at least, in the hands of those who conduct pathological and microscopical laboratories; but the increased attention which will be given by physicians to bacteriological technology may enable pharmacists to increase their sales to physicians of the various substances used.

If Prof. Koch's discovery is to be followed by successful research into the prevention and cure of other diseases by similar methods, it may be that the pharmacology of the future is to bear as little resemblance to that of the present as the latter has to that of antiquity, and that doctors as well as pharmacists will have need for greatly enlarging the area of their usefulness in the community in order to achieve an income. Doubtless, when that time arrives, the employment of remedies directed, as so many now are, to the relief of symptoms, will have greatly diminished, and alkaloidal and other plant derivatives will have given place to polysyllabic substances of purely chemical origin and ptomaines of intensely virulent character, the effects of which upon the vital fluids and processes will be estimated with mathematical precision.

The question of the possibility or otherwise of assaying galenical preparations of the active principles of plants will have been settled by their practical abolition, and the literature of the subject be as much a curiosity as that relating to the discovery of the philosopher's stone.

A CURIOUS coincidence is worthy of being mentioned in this connection. The telegram from Berlin of the 20th of November, above quoted, was published in New York daily papers on the 21st. On the same day the *Medical Record* of this city published a paper by Dr. E. L. Trudeau, of Saranac Lake, N. Y., on "An Experimental Study of Preventive Inoculation in Tuberculosis," in the course of which the author narrates a series of experiments with what seems to be precisely the same fluid as that which Koch claims to be curative, and observed in rabbits much the same disturbance of the general system as that described by Koch when comparatively large quantities of the lymph are so used. These rabbits were subsequently tuberculized, and then killed, and Dr. Trudeau says:

"The results are briefly told. All the rabbits are more or less tubercular. The lesions of those in whom this preventive inoculation [referring to inoculation with 'Dead Surface Cultures,' 'Sterilized Liquid Cultures,' and 'Filtered Cultures'] was practised, differs from those observed in the controls but little, except that in the rabbits previously injected with the filtered cultures . . . the disease is somewhat more advanced."

Here we find a most honest, painstaking, and competent observer, working in the depths of the Adirondack wilderness hundreds of miles from any laboratory, just missing the discovery which is making Koch famous.

WITH this issue we bring our nineteenth volume to a close, and with the commencement of the twentieth we shall inaugurate changes in the character of the jour-

nal which we believe will increase its usefulness for the majority of its readers.

WE would be pleased if our subscribers would make use of our pages for a freer interchange of views upon topics relating to the business of the pharmacist. It is not always, or indeed frequent, that busy men have time for exhaustive compositions upon any subject, no matter how familiar they may have become with its details; but the things which to them appear somewhat trite or trivial are often of great interest to their less accomplished fellows, and afford subjects for study and experiment which fit them for a higher class of work. Every man likes to attain to a reputation for skill and ability in his vocation, but only exceptionally do we find those who possess the opportunities or genius which enable them to carry out a scheme of original research. There are sufficient opportunities, however, in pharmacy for study of questions of daily practice in the laboratory and at the counter to occupy the attention of men of a lower grade of talent, and a suggestive query or a narrative of some difficulty met with in the course of every-day experience will often prove of more immediate and practical value than the longer dissertation upon a more abstruse subject.

Finally, we wish to urge upon those who are not inclined to writing that they may greatly over-estimate its difficulties, and fail to appreciate its effect in increasing their faculties of observation and their knowledge of pharmacy. Every man has had to make a beginning in literary composition, and he who commences soon and writes most will, other things being equal, get the most good from the practice and do the most good for others.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,491.—**Tablet Machine** (D. P. H., Washington, D. C.).

Richter's tablet machine, mentioned on page 204 of our November number, can probably be obtained through Eimer & Amend, of Third Ave., cor. 18th St., in this city, who will import it if they have not got it already.

No. 2,492.—**Lysol** (J. F.).

This is the name of a preparation furnished by Schnelke & Mayr, of Hamburg, which is reported to be a solution of tar oils in soap. According to M. Schottelius, it is an efficient disinfectant. It appears in form of a brown, syrupy, transparent liquid, which can be diluted with water without becoming turbid. It turns red litmus paper blue, but does not contain any free alkali. The specific gravity is about 1.035 to 1.055. The same firm are also preparing a "Lysolum purum," which has the specific gravity 1.042 at 19° C., has a lighter color, and is transparent in thin layers.

We have not seen either preparation so far, but have taken the above data from several exchanges.

No. 2,493.—**Liquid Glycerin Soap** (O. W. T.).

A new formula for this has recently been given by the *Chemiker Zeitung*:

Mix 500 parts of olein, 100 parts of 91-per-cent alcohol, and 280 parts of solution of potassa of 33½ per cent in a flask, shake well, and heat on a water bath, frequently shaking. Now add a solution of 50 parts of potassium carbonate in 100 parts of water, and heat until the resulting soap dissolves to a clear liquid in hot water. Dissolve the soap, with the aid of heat, in 1,570 parts of glycerin, set it aside a few days in a cool place, and filter. The filtrate may be perfumed if it is so desired.

No. 2,494.—**Aseptin and Aseptol** (Newark).

This name has been given to an antiseptic liquid (Wiborgh's) composed of 1 part of alum, 2 parts of boric acid, and 18 parts of water.

It must not be confounded with aseptol, which is a 10-per-cent aqueous solution of orthophenylsulphurous acid, and is also used as an antiseptic.

No. 2,495.—**Impure Salicylic Acid** (Dr. C. W. M.).

Attention has been repeatedly drawn to the fact that the artificial synthetic acid, as it is put on the market, often contains more or less of an impurity, which renders it

irritating to the stomach and sometimes produces alarming symptoms. The presence of this body was first pointed out by Williams. Squibb gets rid of all or most of it by carefully subliming the commercial acid. The impurity is probably due to the presence of cresyl-salicylic acid (so called by Williams), that is, one or more of the cresotic or homosalicylic acids which are formed from cresol contaminating the phenol from which the salicylic acid is made.

A case was recently tried at Glasgow in which the defendant was charged with having sold salicylic acid containing 2½ per cent of cresotic acid. One of the witnesses, Professor Charteris, testified that since the impurities in the artificial acid had been discovered (he mentioned a Mr. Henderson as the discoverer) he had used only the natural acid in his practice. He once administered one grain of the contaminating cresotic acid to a rabbit weighing two and one-half pounds, and found that to be a fatal dose. He believes that all symptoms of delirium and restlessness which artificial salicylic acid often produces in patients are due to the presence of the above-named impurity. Another witness pointed out that, while the melting point of pure salicylic acid is 156.8°, the British Pharmacopœia gave it as 155°. (This is, however, sufficiently exact, though it would be better to say "between 155° and 156°.")

No. 2,496.—**Artificial Mineral Waters** (F. G.).

When the genuine water cannot be had, and even the artificial carbonated water is out of reach, a close approximation to the original may be reached by preparing a saline mixture as closely approaching the constituents of the mineral water, and dissolving a given quantity of this in water. In nearly all cases it will be found preferable to use carbonic water for solution, though the original mineral water may not contain any gas at all.

As our correspondent asks for formulas for preparing certain waters, we quote the following after Dieterich's "Manuale":

1. *Ems, Kraenchen.*

Sodium Chloride	140 grains.
" Bicarbonate	340 "
Potassium Sulphate	6 "
Calcium Sulphate, precip.	45 "
Magnesium Sulphate, dried	32 "

Mix intimately. This quantity is sufficient to make 10 quarts of artificial "Kraenchen" water. Of course, in administering or taking the salt it is not necessary to observe the exact rate of dilution corresponding to the 10 quarts. A suitable amount of the salt (the quantity being stated below in each case; in the present case it is about 15 grains) is put into an 8-oz. tumbler, some carbonic water added, and, after the salt has been dissolved by stirring, the tumbler is filled up with carbonic water, and the contents drank.

These instructions apply also to the following:

2. *Friedrichshall (Bitter-Water).*

Potassium Sulphate	15 grains.
Sodium Sulphate, dried	620 "
" Chloride	1780 "
" Bicarbonate	154 "
" Bromide	20 "
Calcium Sulphate, precip.	256 "
Magnesium Sulphate, dried	2000 "

Mix thoroughly. Will make 10 quarts of artificial bitter-water. For one tumbler, about 120 grains.

3. *Carlsbad.*

Potassium Sulphate	24 grains.
Sodium Chloride	150 "
" Bicarbonate	425 "
" Sulphate, dried	280 "
Calcium Sulphate, precip.	75 "
Magnesium Sulphate, dried	32 "

Mix thoroughly. To make 10 quarts. For one tumbler, about 24 grains.

4. *Pullna (Bitter-Water).*

Sodium Sulphate, dried	1760 grains.
Potassium Sulphate	90 "
Sodium Chloride	880 "
" Bicarbonate	260 "
Magnesium Sulphate, dried	2800 "
Calcium Sulphate, precip.	90 "

Mix thoroughly. To make 10 quarts. For one tumbler, about 140 grains.

5. *Vichy (Grande Grille).*

Potassium Sulphate	80 grains.
Sodium Chloride	84 "
" Bicarbonate	980 "
Magnesium Sulphate, dried	10 "
Calcium Sulphate, precip.	64 "

Mix intimately. To make 10 quarts. For one tumbler, about 28 grains.

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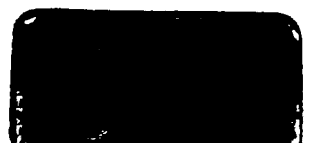
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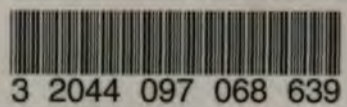
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